Welding Engineer

PRICE 50 CENTS

MARCH, 1956

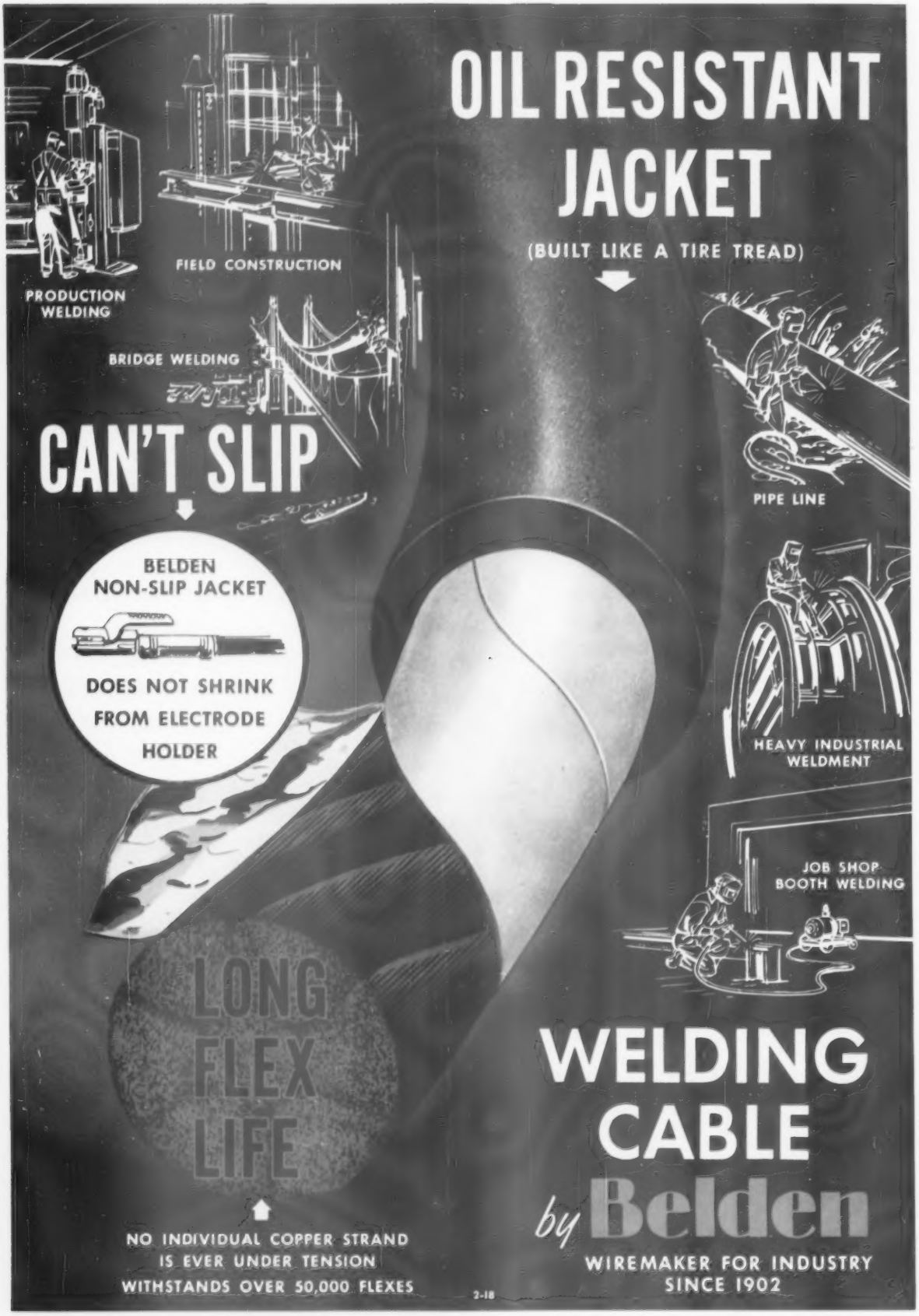
Distributor Issue

ARC-SPOT miller GENERATORS WELDERS

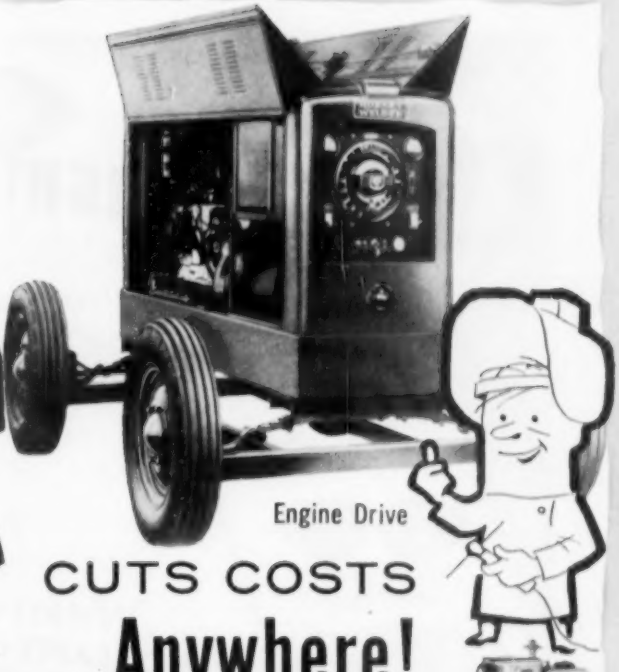
miller
ELECTRIC MANUFACTURING CO., INC.
APPLETON, WISCONSIN

The Miller SRTA ac-dc welder illustrated is ideal for *both* inert gas and metallic arc welding. Affords instant change from ac to either straight or reverse polarity dc. There's a Miller for every arc welding purpose and

". . . if it's MILLER you know it's the finest . . ."


OIL RESISTANT JACKET
(BUILT LIKE A TIRE TREAD)
PRODUCTION WELDING
FIELD CONSTRUCTION
BRIDGE WELDING
CAN'T SLIP
BELDEN NON-SLIP JACKET
DOES NOT SHRINK FROM ELECTRODE HOLDER
PIPE LINE
HEAVY INDUSTRIAL WELDMENT
JOB SHOP BOOTH WELDING
LONG FLEX LIFE
NO INDIVIDUAL COPPER STRAND IS EVER UNDER TENSION
WITHSTANDS OVER 50,000 FLEXES
WELDING CABLE
by Belden
WIREMAKER FOR INDUSTRY SINCE 1902
2-18

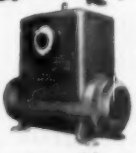
Electric Drive



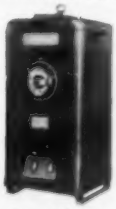
Engine Drive

CUTS COSTS in Your Plant

Ideal for production, maintenance, repair, and automatic welding, Hobart Electric Drive Welders give you top performance at low cost. Liberal use of copper, two-way ventilation, greater arc stability, and safer, more efficient operating temperatures make Hobart today's best value. There is a Hobart specifically designed to do your work and cut your costs.



Bantam Champ



Rectifiers

"Powromatic"

CUTS COSTS ...Anywhere!

Hobart's 1,000 combinations of welding heat, teamed with auxiliary power on "go anywhere" portable mountings mean you can handle all jobs at less expense. Convenience features that are standard equipment give you dollar savings when you purchase a Hobart, and continue to save you money throughout the welder's lifetime.

"Husky Boy"

Water Cooled AC-AC

Air Cooled AC-AC

Get HOBART "Simplified" ARC WELDERS

HOBART BROTHERS COMPANY, Box U-36, Troy, Ohio, Phone 21223

One of the world's largest builders of arc welding equipment

HOBART electrodes make better welds!

There's a Hobart electrode for every application of AC or DC welding. Tell us the type of work you do—and we'll see that you get information on the rod that will give you best performance at low cost.

HOBART BROTHERS CO., Box U-36, Troy, Ohio, Phone 21223

- ☐ Tell me about_____ amp. capacity
- ☐ Electric Drive ☐ Bantam Champ ☐ Rectifier
- ☐ Automatic Welding ☐ Engine Drive ☐ Husky Boy
- ☐ AC Power—AC Welder Combination

Our work is_____

NAME_____

FIRM_____

ADDRESS_____

CITY_____ STATE_____

☐ Send information on Arc Welding Electrodes.

CESCO RIGHT... before your Eyes!

Cup-type Goggles

Spectacle-type Goggles

Chemical Goggles

Plastic Frame Goggles

Cover Goggles

Lite-Specs

Fiber Glass Helmet

Approved Respirator Hood

Face Shields

WHATEVER TYPE OF SAFETY EQUIPMENT YOU NEED...BUY WITH CONFIDENCE from the CESCO Distributor listed here

• You don't need to hunt for the best source of safety equipment. Take it from CESCO, you can buy with confidence from the firms listed here. CESCO has the finest type of distributor representation—the kind you want when in the market for every type of safety and protective equipment. These firms are safety specialists and well stocked with equipment that has stood the test of time in industrial plants everywhere.

You can buy with confidence from CESCO distributors

ATLANTA, GA.
Guardian Safety Equipment Co.
4271½ Moreland Avenue, N. E.

BIRMINGHAM, ALA.
"L. P." Hartess Company
2627 Seventh Avenue, South

BOSTON, MASS.
General Equipment Corporation
261 Franklin Street

BUFFALO, N. Y.
The Watson Company
1443 Main Street

CHICAGO, ILL.
Universal Safety Equipment Co.
5115 Diversey

CINCINNATI, OHIO
Williams & Co., Inc.
3231 Fredonia Avenue

CLEVELAND, OHIO
Williams & Co., Inc.
3700 Perkins Avenue

COLUMBUS, OHIO
Williams & Co., Inc.
851 Williams Avenue

DALLAS, TEXAS
Guardian Safety Equipment Co
900 Jefferson Tower Bldg.

DETROIT, MICH.
Averill Equipment Company
19225 Consant Avenue

HOUSTON, TEXAS
Guardian Safety Equipment Co.
1915 Westheimer

KANSAS CITY, MO.
Safety, Incorporated
17 E. 31st Street

KNOXVILLE, TENN.
Safety Equipment Distributing Co
832 W. Main Avenue

LITTLE ROCK, ARK.
Fire Appliance & Safety Co.
1114 W. Markham

LOS ANGELES, CALIF.
Guardian Safety Equipment Co.
7223 S. Main Street

LOUISVILLE, KENTUCKY
Williams & Co., Inc.
1109 S. Preston Street

MILWAUKEE, WIS.
Universal Safety Equipment Co.
3155 S. 7th Street

ORANGE, N. J.
Guardian Safety Equipment Co.
400 S. Jefferson Street
(New York-New Jersey Area)

PEORIA, ILL.
Universal Safety Equipment Co.
116 S. Garfield

PHILADELPHIA, PA.
Guardian Safety Equipment Co.
214 S. 45th Street

PITTSBURGH, PA.
Williams & Co., Inc.
901 Pennsylvania Avenue

ST. LOUIS, MO.
Safety, Inc.
2608 Olive Street

ST. PAUL, MINN.
Continental Safety Equipment, Inc.
1551 Selby Ave.

SALT LAKE CITY, UTAH
Universal Fire & Safety
Equipment Co., Box 1587

SAN MATEO, CALIF.
Guardian Safety Equipment Co.
220 Third Avenue

SPOKANE, WASH.
Spokane Safety Appliance Co.
North 219 Division Street

TOLEDO, OHIO
Williams & Co., Inc.
946 Kane Street

TULSA, OKLA
Guardian Safety Equipment Co.
1742 S. Main Street

WICHITA, KANS.
Guardian Safety Equipment Co.
723 S. Broadway

MEXICO CITY, D. F.
Safety Equipment S. A.
Sullivan—95

MONTREAL, CANADA
The Butler Optical Company, Ltd.
1520 Mountain Street

Approved Respirators

CESCO FOR SAFETY

CHICAGO EYE SHIELD COMPANY
2330 Warren Boulevard
Chicago 12, Illinois

Welding Engineer

MARCH, 1956
VOL. 41—No. 3

THE MAGAZINE OF JOINING
AND SEVERING OF MATERIALS

America's pioneer publication which, combined with The Acetylene Journal, has been devoted to the interest of the welding and allied industries since 1898

Copyright 1956 by
WELDING ENGINEER PUBLICATIONS, INC.

12 East Grand Avenue
Chicago 11, Illinois
Telephone: DElaware 7-0339

TED B. JEFFERSON
Editor and Publisher

FELIX T. TANCULA
Executive Editor

JACK FAIRLIE
Associate Editor
AUDREY L. MADSEN
Assistant Editor
B. M. BRITE
PHYLLIS MELBY
Editorial Assistants

PATRICE L. SIMPSON, *Production*

JIM BREWSTER, *Circulation*

WARREN WARE
Western District Manager
12 E. Grand Ave., Chicago 11, Ill.
Telephone: DElaware 7-0339

HERMAN PHELPS
Eastern District Manager
P. O. Box 128, White Plains, N. Y.
Telephone: WHite Plains 9-3876

MEMBER
American Welding Society
International Acetylene Association
Compressed Gas Association
National Welding Supply Association
Associated Business Publications
Audit Bureau of Circulations

Single copies 50 cents. Subscription rates: United States and possessions $3 per year; $4 for two years; $5 for three years. Canada $5 per year; $8 for two years; $10 for three years. All other countries $15 per year; $25 for two years; $30 for three years. Position and company affiliation must be indicated on subscription form. Allow one month for change of address.

Entered as second class matter Aug. 23, 1948, at the Post Office at Chicago, Ill., under Act of March 3, 1879. Printed in U. S. A.

WELDING ENGINEER is indexed regularly by Engineering Index, Inc.

SPECIAL DISTRIBUTOR FEATURES

A welding clinic marks distributor expansion ... 23
The personal touch sparks a popular welding clinic ... 24
Here's how to make a slow day pay ... 29
Supplier stocks steel shapes ... 46

FABRICATION

Automated welds lead to improved water heaters ... 30
F. T. Tancula
All-welded shop crane ... 34
Howard Boyle
Faster plate welds ... 38
Albert Bavaria
Welded steel tube aids the search for offshore oil ... 48

JOB SHOP

Soldering flaws in zinc die castings ... 18
H. C. Phelps

OPERATION

Production welding controls ... 20
Rex Cleveland
New brazing unit gives stronger tube joints ... 51

CONVENTIONS

NWSA heads for New Orleans meeting ... 17
IAA's 56th meeting scheduled for Los Angeles ... 40
300 attend Midwest Welding Conference ... 45

MAINTENANCE

Thermit welding sugar mill machinery ... 56
E. E. Cuntz

RESEARCH

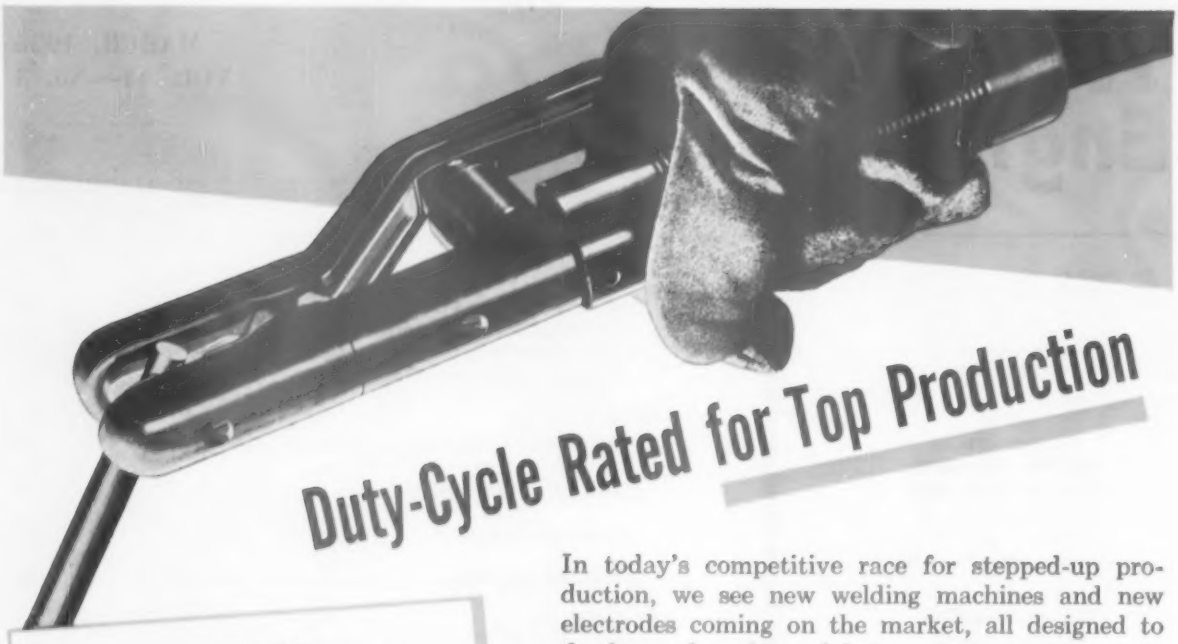
Arrest cracks in mild steel ... 26
P. P. Puzak and W. S. Pellini

DEMOLITION

Flame-cutting crews raze the 3rd Ave. "El" ... 32

DEPARTMENTS

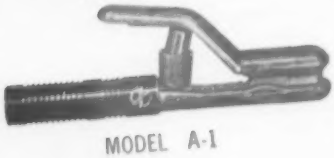
News ... 5
Letters to the editor ... 12
Editorial: The search for profits ... 15
The welding clinic: Stored energy for resistance welding ... 52
On the job ... 61
Data Sheet No. 186: Trade names of silver brazing alloys ... 65
New Products ... 75
People ... 106
Book reviews ... 111
30 years ago ... 113
Advertisers in this issue ... 114
Where to buy ... 114
The Welding Shopper ... 115
Free literature ... 116
Literature offered in ads ... 116
Welding Info-Aids ... 117



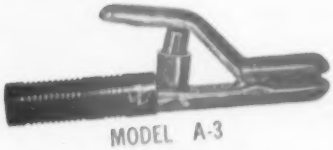
Duty-Cycle Rated for Top Production

JACKSON
Insulated Copper Alloy Holders

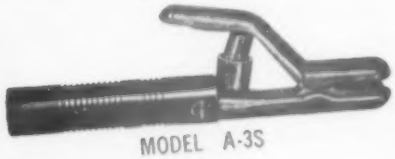
MODEL AW-C



MODEL A-1



MODEL A-3



MODEL A-3S

QUALITY JACKSON PRODUCTS

Sold through Distributors and Dealers throughout the United States and Canada

In today's competitive race for stepped-up production, we see new welding machines and new electrodes coming on the market, all designed to do the work easier and faster.

Therefore, in choosing the right electrode holder for a job, don't think of *rod size* alone. We must equally consider *amperage* and *cable size*, and today, more than ever, the required *number of electrodes per hour*. These four factors combined establish the *duty cycle*, that is the percentage of actual arc-time in any ten-minute period of work.

The following table shows the duty cycles possible with the various *Jackson Insulated Copper Alloy Holders*, based on using the electrodes and cable sizes as indicated.

Holder Class	Model Number	Electrode Size	Amperage	Cable Size	Duty Cycle
SMALL	AW-C	7/32"	250 300	1 1/0	50%
MEDIUM	A-1	1/4"	300 350	1/0 2/0	50%
LARGE	A-3	3/8"	375 450	2/0 3/0	65%
HEAVY-DUTY	A-3S	3/8"	500	4/0	80%

This table will help you in making the right selection from these Jackson copper alloy holders. Using a superior 98% copper alloy heat treated for greater strength, hardness and conductivity, these holders permit highest duty cycles with ample margin of safety.

JACKSON
PRODUCTS, INC.
WARREN · MICHIGAN

SKYSCRAPER adds color to skyline with aluminum and blue exterior. (See story below.)

DEALER meets manufacturer (and vice-versa) as common problems and new ideas are discussed at recent meeting. (See story below.)

News

Welded skyscraper has new look

The Henry C. Beck Building, newest and tallest office building in Shreveport, La., has brought a new look to skyscrapers. It is said to be the world's first welded skyscraper with a colored aluminum exterior curtain wall.

An outstanding structure of its type, the Beck Building has an aluminum and blue exterior "skin" over a steel frame of all-welded structural joints. This combination is currently being used to advantage in multi-story buildings.

The recently completed, 20-story Beck Building is reported to be one of the world's tallest welded buildings.

—The Lincoln Electric Co.

M & T to mine titanium ore

Metal & Thermit Corp., New York City, has purchased an 800-acre tract in Virginia and will begin construction of a plant for mining and processing of titanium. The new plant will be five miles west of Montpelier.

The new facility will produce both rutile and ilmenite, extracting these materials from the ore. Rutile is used in electrode coating as well as in titanium metal. Ilmenite is basis of titanium pigments used in paints, plastics, etc.

The building will be a conventional gravity ore dressing plant, equipped for crushing the ore and extracting the materials by magnetic separation.

Construction will start in the spring of this year, with the plant to be completed in the fall.

Olin Mathieson enters aluminum industry

Latest entrant into the rapidly expanding aluminum field will be Olin Mathieson Chemical Corp., New York City. Olin plans to construct what may well be the world's first fully integrated aluminum plant. Coal mined directly on the site will be used to provide power requirements.

The new facilities will be in the Ohio River Valley. The alumina plant, reduction plant and rolling mill will be on the Ohio River near Clarington, Ohio. The power plant will be on the West Virginia side at Cresap Bottom.

The alumina plant will have a capacity of 230,000 tons per year; aluminum plant capacity will be 60,000 tons per year.

Shieldalloy sales in new offices

The sales organization of Shieldalloy Corp., New York City, recently moved into its new offices in Newfield, N. J.

Manufacturer is also distributor

Creative business today means aggressive sales programs involving extensive product and sales training. A manufacturing firm which must also meet problems of the distributor is Victor Equipment Co., San Francisco.

In its local area, Victor carries on retail activities through its stores in San Francisco, Oakland and Los Angeles, to name a few. To help solve problems of the retailer, and to aid in creating better business, Victor recently attended a sales conference held by representatives of General Electric Co., York, Pa., one of its suppliers.

The day-long meeting reviewed General Electric's and Victor's performance in the past, what was expected of Victor as a dealer in the future, and what General Electric was prepared to give Victor to help it in its role of distributor.

Over 24 branch and field representatives attended the meeting conducted by Austin Leach of General Electric Co. All felt the conference was a success because of interchange of stimulating ideas and discussion of common problems.

RW manufacturers have profitable 1955

With final figures compiled, the Resistance Welder Manufacturers' Association, Philadelphia, points to 1955 as an excellent year for resistance welding production.

New business during last year showed an increase of nearly 33% over orders received during 1954. Shipments for last year increased 10% over the similar period in 1954.

News

from page 5

RETAIL store newly-opened by Industrial Air Products Co. in Portland, Ore., emphasizes effective sales display. Ample lighting and modern decor help create favorable sales situation. Product displays are tasteful, uncluttered; wall rack, placards conserve space.

WELDING of double-tube sections for Baltimore harbor tunnel is expedited by use of turning rolls. (See story below.)

New firm enters powder metallurgy

The Schwarzkopf Development Corp. was formed recently in New York City, by Dr. Paul Schwarzkopf, president and sole owner. The new corporation, whose activities will cover all fields of powder metallurgy, succeeds the American Electro Metal Corp. (of Maryland).

Also established was Mallory-Schwarzkopf-Metals, Inc., which is jointly owned by P. R. Mallory & Co., Indianapolis, and Schwarzkopf. This new company will produce molybdenum and other high-melting metals. A new plant being built in Huntsville, Ala., will begin production by late 1956. P. R. Mallory has been elected president.

Clinic presents latest processes

The first Santa Clara Valley welding show and clinic will be held April 27 and 28 in San Jose, Calif. The event, first of its kind in the Bay region, will be held in the Engineering building of San Jose State College, 8th and San Fernando Sts. Sponsors of the event are the Santa Clara Valley section of the American Welding Society and the engineering department of San Jose State College.

Visitors will see the latest in welding equipment. There will be photographic displays of large welded projects, product displays and demonstrations of new processes. Local suppliers as well as firms with national distribution will exhibit.

Iowa distributor sells branch

The Ottumwa, Ia., branch of Kacena Co., Cedar Rapids, Ia., was sold recently to Ottumwa Welding Co., Ottumwa. The branch has been renamed Valley Supply Co. All present employes have been retained, with Ernest Hanna as manager.

Form Green Bay welding supply firm

Green Bay Welding Supply, Inc., was incorporated recently by Charles and Marion E. Joops and Robert Petitjean. The new firm is located at 143 Miramar Dr., Green Bay, Wis.

Sellstrom purchases PenOptic Division

Sellstrom Mfg. Co., Palatine, Ill., has purchased the Industrial Safety Equipment Division of the Pennsylvania Optical Co., Reading, Pa., All inventories and equipment will be moved to the Sellstrom plant at Palatine. The new safety products will be marketed under the Sellstrom name.

Baltimore tunnel has welded sections

A giant automobile tunnel under construction at Baltimore, Md., will reduce driving time from the northeastern side of the city to the southwestern.

For efficiency in welding sections for the tunnel, turning rolls are being used for positioning. A total of 21 double-tube sections will be fabricated for the tunnel, which will lie 75 ft below the Patapsco River.

After fittings and assemblies of the twin 300-ft sections are finished, shell units are positioned horizontally on a series of turning rolls.

When completed the new tunnel will be the major link of a new $130,000,000, 16-mile expressway.

—Worthington Corp.

Air Reduction plans gas facility expansion

To meet increasing demand for its industrial gases, a $16,000,000 expansion program is under way by Air Reduction Sales Co., a division of Air Reduction Co., Inc., New York City. Scheduled for completion this year are three new plants at Chicago, Alton, Ill., and Calvert City, Ky. Additional production facilities will be installed at Butler, Pa.

Included in the program are ad-

(Continued on page 94)

2 safety valves . . .

quickly adjustable but entirely tamper proof

Only an Allen wrench of proper size will adjust the pressure setting of these "*self-reseating*" relief valves. They are tamper proof and cannot be made inoperative by unauthorized and inexperienced individuals.

safety—that's their only business

and, to be safe they must have the ability to stay safe . . .

These two, self-reseating, safety valves fully protect both the first and second reduction stage of this regulator. The relief valves, both of identical design and construction and with interchangeable parts, are factory set to work at pressures slightly beyond proper working pressure maximum. Your repair man can reset them easily and absolutely reliably—however, outsiders may not do so; that is important to you.

a safety valve which can be tampered with is very dangerous indeed . . .

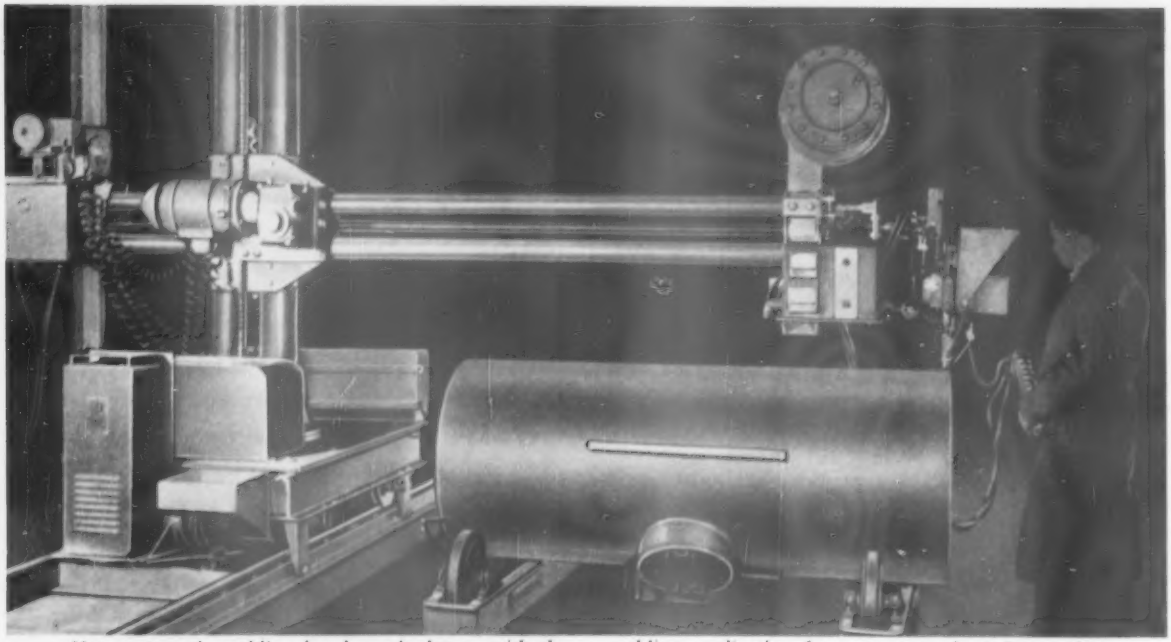
National of . . . california

a 40-page book — free of charge — offers you a wealth of regulator data; why not write for it TODAY.

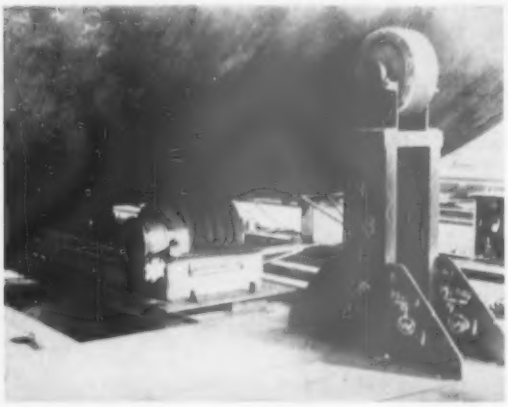
NATIONAL welding equipment company... 218 fremont street san francisco 5 california

Automatic welding made easy!

Now—only Worthington offers complete basic equipment line—plus nationwide sales and service

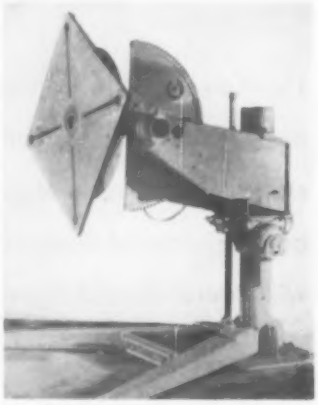


New automatic welding head manipulator—with the welding head and accessories you want—completes Worthington's welding equipment line. You can get all the basic equipment you need for every automatic welding application from one experienced manufacturer. Accurate, dependable ratings on every unit. Choose from the largest standard equipment line on the market.



Automatic turning rolls permit you to rotate cylindrical work for welding and assembly simply by pushing a button.

New power elevation is standard on four Worthington welding positioners. Now tilt, rotation and lift are all automatic. And at Worthington you get the equipment and service you need—when you need it.



Write for details to Worthington Corporation, Positioning Equipment Division, Section Y.6.2, Harrison, New Jersey.

Y.6.2

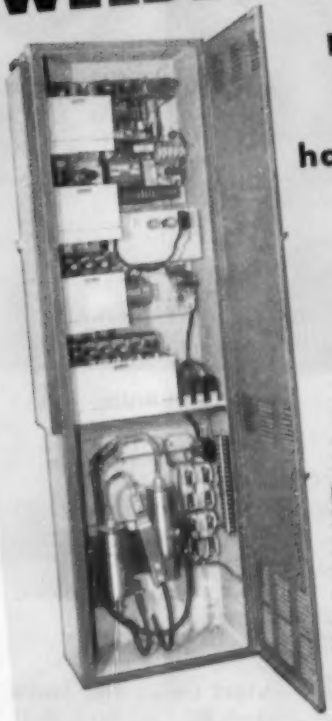
WORTHINGTON

Welding Positioners • Turning Rolls • Manipulators

A. O. Smith developed the exclusive techniques and machines for making non-corrosive "lined" pressure vessels for use in oil refineries, pulp digesters and chemical plants. The non-corrosive liners are spot welded to the inside of the vessel with thousands of welds.

Square D Welder Control proved itself in production by increasing speed, adding to the strength of the welds and reducing repairs

SQUARE D *Electronic* WELDER CONTROL



provided these improvements on one hard-to-weld alloy:

SPEED
Increased 22%!

STRENGTH
Increased 13%!

REPAIRS and REWORKING
Reduced 85%!

What is YOUR Precision Welding Problem?

- *Stainless Steel?*
- *Aluminum?*
- *Magnesium?*
- *Air-Hardenable Steels?*
- *Low-Carbon Steels?*
- *Aluminum-Magnesium Alloys?*

Square D has the control to meet your exact needs. Write us for Bulletin 8993. Address — Square D Company, 4041 N. Richards Street, Milwaukee 12, Wis.

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY

save MAN HOURS and SET-UP DOLLARS

WITH

PANDJIRIS

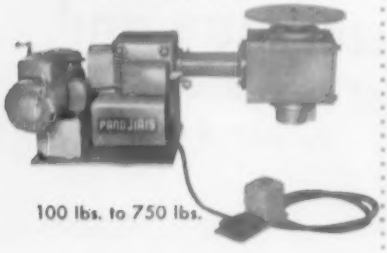
SUPER-ACCURATE POSITIONERS

- position the work for accurate drilling or tapping on *five sides with one set up.*
- designed for exacting aircraft—type weld jobs and heavy drilling.
- fast 360° rotation—135° tilt with positive locking.
- two heavy-duty 2-speed brake motors
- precision machine tool gearing
- finger-tip controls

20,000 lb. capacity

PRECISION THE PLUS IN PANDJIRIS POSITIONERS

PORTABLE BENCH POSITIONERS
... perfect for small assembly and welding operations



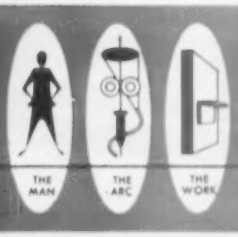
100 lbs. to 750 lbs.

POWER TURNING ROLLS
position vessels for circumferential welds

1,000 lbs. to 400,000 lbs.

WELDING WORK POSITIONERS
from 100 lbs. to 60,000 lbs.

VISIT US AT THE SHOW
Booth #91 • May 9, 10, 11



THE WORLD'S LARGEST MANUFACTURERS OF "AUTO-WELD-MATONS"

Write on Your Letterhead for Pandjiris Complete Line Catalog Now!

PANDJIRIS WELDMENT CO.

DESIGNERS AND MANUFACTURERS OF PRODUCTION WELDING EQUIPMENT

5151 NORTHRUP AVENUE ST. LOUIS 10, MO., U. S. A.

efficient positioning of all three

Specify Carol

DYNAPOWER Welding Cable

for outstanding toughness and flexibility...

Better welding begins with Carol Cable. *Flexible* for easier handling . . . makes jobs go better with less fatigue. *Tougher* for longer life. Saves replacement costs . . . cuts down work interruptions.

Like all Carol Cable, Dynapower Welding Cable is *precision made*. Carol's special stranding combines thousands of soft, fine wires into a cable that's superbly flexible. And husky Carol insulation—specially compounded—assures maximum resistance to damage by abrasion, oil and solvents.

Available in sizes from 4/0 to No. 6 gauge, in rubber and Caroprene® jackets.

Get full information today. Write Dept. WE.

Carol®

CAROL CABLE COMPANY

DIVISION OF THE CRESCENT COMPANY, INC., PAWTUCKET, RHODE ISLAND

Serving industry for more than 30 years

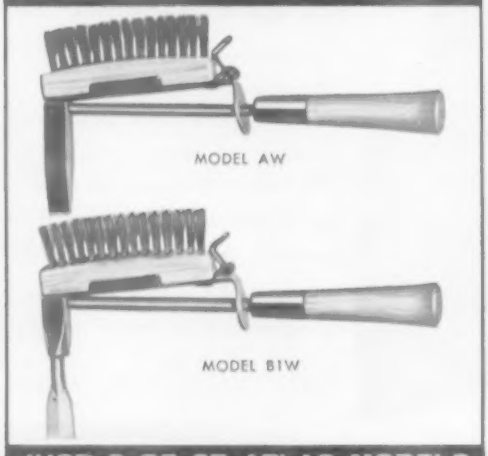
Atlas introduces a NEW Wood Grip

IT FITS THE HAND

Easier to Grip!

Safer!

FAMOUS ATLAS "DUAL TOOLS"



JUST 2 OF 27 ATLAS MODELS

PROVED PRACTICAL ATLAS WELDING ACCESSORIES

Ask your welding supply dealer to show you the complete Atlas line. Atlas "Tomahawks" and "Dual Tools" are constructed to outlast ordinary weld cleaning tools and actually cost less in the long run. Welders like their "feel" and balance, turn out more and better work with less fatigue.

ATLAS WELDING ACCESSORIES CO.

707 E. LEWISTON AVENUE, FERNDALE 20 (DETROIT) MICH.

Letters should be addressed to: The Editor, WELDING ENGINEER, 12 E. Grand Ave., Chicago 11, Ill. No letter will be published unless signed, but your name will be withheld if requested.

40th Anniversary issue

Dear Sir:

Congratulations on your 40th Anniversary issue and on your excellent editorial summarizing the history of WELDING ENGINEER.

Your editorials are always stimulating and represent an outspoken position on a progressive stand. It certainly takes courage to forcefully present one's opinions. You are to be complimented for combining forthright, courageous exposition with clear and progressive thinking.

Orville T. Barnett
Armour Research Foundation

Dear Sir:

. . . You may well be proud of your 40th Anniversary issue because it certainly is one of the most informative and outstanding issues that you have published. I certainly would appreciate receiving another copy.

P. M. Hall
Department of Commerce

Dear Sir:

I enjoyed reading your 40th Anniversary issue. Congratulations! I would appreciate having an extra copy for my personal files.

C. G. Herbruck
The Lincoln Electric Co.

Dear Sir:

You can certainly be proud of your 40th Anniversary issue which in our opinion is the most outstanding issue ever published in the welding industry. It is one that will be kept by those who receive it.

Jack Honhart
Atlas Welding Accessories, Inc.

Dear Sir:

You have every reason to be proud of the 40th Anniversary issue of WELDING ENGINEER. I would very

(Continued on page 66)

2 GREAT NEW SILVER BRAZING FLUXES...

The broad variations in joint design, metals and methods encountered in low temperature silver brazing make it impossible to manufacture a single flux to act with maximum efficiency on all jobs. A large proportion of routine brazing work can be accomplished efficiently with a general purpose flux but in an increasing number of instances, manufacturers are finding that more rapid, consistent production, greater economy and fewer rejects are a matter of record by selecting correctly from the APW line.

Four standard APW formulae (APW1100, APW-1200, Deoxo and Black Flux) are available to simplify selective fluxing for you, to insure complete efficient protection in any classification of silver brazing. They enable the technician to key the selection of flux to the precise requirements of the job in production.

A "Complete Guide To Selective Fluxing" will be sent you upon request. It contains complete, factual data that you should know. If you wish, an expert Silvaloy Technician will be glad to consult with you, at your convenience. Call the Silvaloy Distributor in your area or write us directly. ★ ★ ★ ★ ★ ★

IF EXTRA COPIES ARE DESIRED FOR BRAZING PERSONNEL PLEASE SEND REQUEST ON COMPANY LETTERHEAD

THE SILVALOY DISTRIBUTORS

EAGLE METALS COMPANY
SEATTLE, WASH. • PORTLAND, ORE.
SPOKANE, WASH.

EDGCOMB STEEL COMPANY
PHILADELPHIA, PA. • CHARLOTTE, N. C.
BALTIMORE, MD. • YORK, PA.
KNOXVILLE, TENN.

MAPES & SPROWL STEEL COMPANY
UNION, NEW JERSEY
NEW YORK CITY

NOTTINGHAM STEEL COMPANY
CLEVELAND, OHIO

PACIFIC METALS COMPANY LTD.
SAN FRANCISCO, CALIFORNIA
SALT LAKE CITY, UTAH
LOS ANGELES, CALIFORNIA
SAN DIEGO, CALIFORNIA

OLIVER H. VAN HORN CO., INC.
NEW ORLEANS, LOUISIANA
FORT WORTH, TEXAS
HOUSTON, TEXAS

LICENSED CANADIAN MANUFACTURER
BAKER PLATINUM OF CANADA, LTD.
TORONTO • MONTREAL

EDGCOMB STEEL OF NEW ENGLAND, INC.
MILFORD, CONNECTICUT
NASHUA, NEW HAMPSHIRE

STEEL SALES CORPORATION
CHICAGO, ILL. • MINNEAPOLIS, MINN.
INDIANAPOLIS, IND. • KANSAS CITY, MO. • GRAND RAPIDS, MICH.
DETROIT, MICH. • ST. LOUIS, MO.
MILWAUKEE, WIS.

BURDETT OXYGEN COMPANY
CLEVELAND • CINCINNATI
COLUMBUS • AKRON • DAYTON
YOUNGSTOWN • MANSFIELD • FINDLAY

THE AMERICAN PLATINUM WORKS

231 NEW JERSEY RAILROAD AVENUE • NEWARK 5, NEW JERSEY

APW

When a sheet metal electrode...

Has exceptionally smooth arc action... easy slag removal...

Yet operates on lower currents without sticking... with less burn through...

WHY

use anything but FLEETWELD 37 for thin gauge work

An E-6013 electrode made specially for sheet metal

FLEETWELD 37

to give you:

- Lowest burn through
- Less sticking at low currents
- Smoother corner and edge welds
- Faster operation on DC negative
- Easier operation on vertical up welds

than with conventional E-6013 electrodes

Specifications and Procedures are given in Weldirectory SB-1351. Write

THE LINCOLN ELECTRIC COMPANY
Cleveland 17, Ohio

LINCOLN... one dependable source for all your welding needs

© 1956 The Lincoln Electric Company

THE LINCOLN ELECTRIC COMPANY
Dept. 1713, Cleveland 17, Ohio

☐ Send me Bulletin SB-1351.
☐ Have representative call.

Company_____

Address_____

City_____ State_____

Name_____

Position_____

MARCH, 1956

Welding Engineer

ESTABLISHED 1916

The search for profits

THIS MONTH, the National Welding Supply Association will hold its 11th annual meeting in New Orleans. Welding distributors from all over the country will discuss and hear others discuss the subject of "what is wrong with business." Many are finding that business is good, but that they have to work for it. The problems of every businessman are many, and his lot is becoming increasingly difficult in the highly competitive world in which we must make a living.

In many respects, the problems confronting the welding distributor are the same as those that confront every businessman, particularly small firm operators. Welding distributors have found that their costs are going up while profit is coming down. On the assumption that misery loves company, they may be cheered a bit to learn that they are not alone. This same situation prevails today in every small business.

About this time every year, those who operate such businesses begin to wonder who they are working for: the government, their suppliers, employees, the bankers, or themselves. There are a lot of people riding on the businessman's back. Little wonder that sometimes he gets into trouble. There are only 24 hours in a day and everyone—even the boss—has to get four or five hours of sleep so he can think straight at least half the time.

EVERY distributor knows that operating a welding-supply business is not the "bed of roses" their employees sometimes think. The boss has his days filled with decisions—decisions which must be the right ones in order to keep the *customer* happy, the *employees* happy, the *business profitable*.

If his problems were only those of selling welding equipment, the job would not be too bad. But there are many operations he must perform that do not benefit him—either directly or indirectly. In fact, some *cost* him money.

Why must a businessman absorb in his cost the expenses of being a taxpayer or a dues collector?

WE KNOW of one large distributor who has several employees on his payroll that do not actually work for him. It sounds silly, but he pays salaries and provides office space, office equipment and machines for "employees" who are merely tax collectors and dues collectors. The chore of withholding federal income and social security taxes is bad enough, but many distributors also have to collect and segregate state, county and local sales taxes.

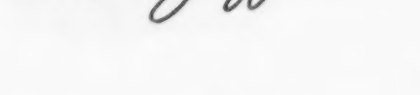
If your profits are going down, look around to see how many of your employees are working for someone else. Some savings might be possible there.

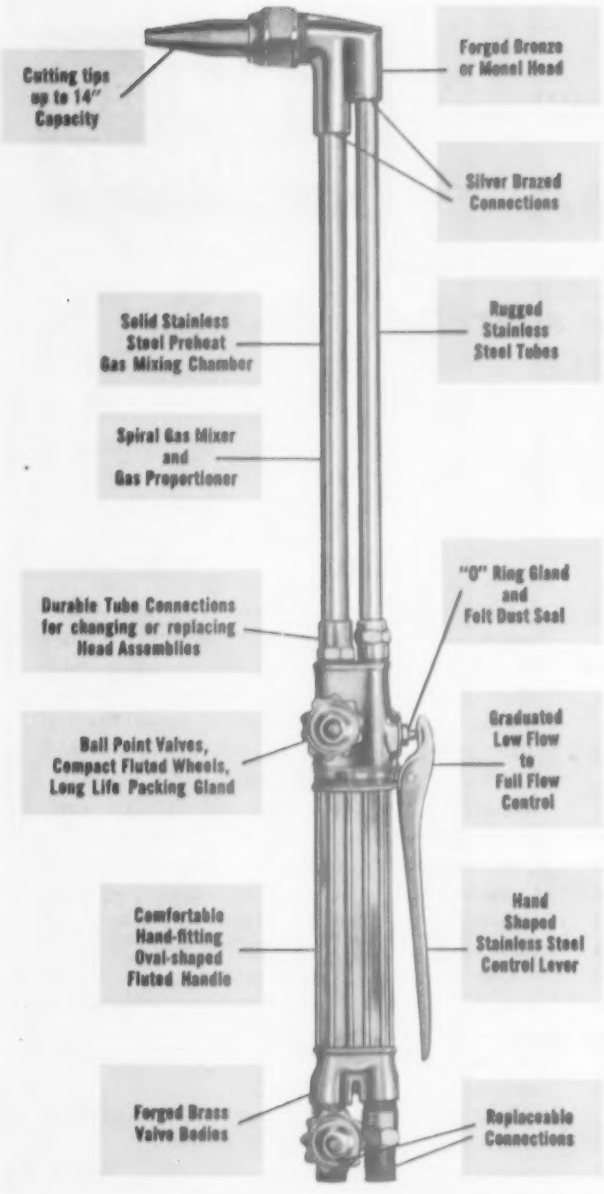
One of the big problems facing distributors today is increasing costs. Have you looked into the question of how much shipping costs are taking out of your dollar? Warehouse and packaging costs are also up.

One way to beat increasing costs is to increase your company's productivity. How much do you expect your salesmen to produce each month? Will they make a profit for you on $6,000 in sales? It might be a good idea to find out where the salesman fits in the profit picture.

Do you have enough salesmen to cover the territory? If three salesmen are producing $30,000 worth of business a month, would 10 produce $100,000? There is a possibility that the larger number might prove more profitable.

Now might be a good time to analyze your various costs and expenses, with some thought toward reducing overhead and increasing productivity so as to make 1956 not only the best sales year, but also the most profitable.




Cutting tips up to 14" Capacity
Forged Bronze or Monel Head
Silver Brazed Connections
Solid Stainless Steel Preheat Gas Mixing Chamber
Rugged Stainless Steel Tubes
Spiral Gas Mixer and Gas Proportioner
"O" Ring Gland and Felt Dust Seal
Durable Tube Connections for changing or replacing Head Assemblies
Graduated Low Flow to Full Flow Control
Ball Point Valves, Compact Fluted Wheels, Long Life Packing Gland
Hand Shaped Stainless Steel Control Lever
Comfortable Hand-fitting Oval-shaped Fluted Handle
Forged Brass Valve Bodies
Replaceable Connections

VICTOR CUTTING TORCHES

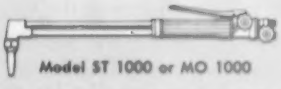
Try this torch on your toughest cutting job . . . you'll find it keeps a cool head . . . time tested Victor spiral mixer and gas proportioner assures safe, economical operation.

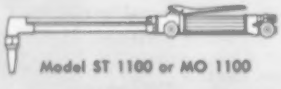
Note clean lines . . . try its comfortable balance and hand-fitting handle . . . quality construction assures trouble-free performance and ease of repair and replacement of damaged parts.

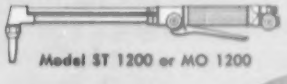
Choice of Monel (MO) or bronze (ST) heads . . . four control lever positions to suit every operator preference and job need. Four lengths: 21″, 27″, 36″ and 48″, available with 90°, 75°, 45° (ST Models only) or 180° angle heads.

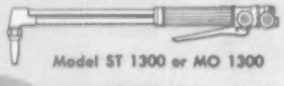
Why experiment? Ask your Victor dealer to demonstrate this field-tested, operator approved torch on your hottest, toughest cutting job. Call him NOW.

FOUR LEVER POSITIONS


Model ST 1000 or MO 1000


Model ST 1100 or MO 1100


Model ST 1200 or MO 1200


Model ST 1300 or MO 1300

For maximum efficiency and safety use genuine Victor tips and parts.

Listed by Underwriters Laboratories, Inc.

VICTOR for welding

29

VICTOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment; hardfacing rods, blasting nozzles; cobalt & tungsten castings; straightline and shape cutting machines.

844 Folsom St., San Francisco 7 • 3821 Santa Fe Avenue, Los Angeles 58

HOTEL Roosevelt in New Orleans will be headquarters for NWSA conventioneers, and many events will be held in hotel's International Room.

To "widen the margin":

NWSA heads for New Orleans meeting

THE 12TH ANNUAL National Welding Supply Association convention will be held March 19 through 22 at the Hotel Roosevelt in New Orleans, La.

The NWSA convention committee, which selected New Orleans as the site of the four-day meet, represents welding supply and equipment firms in many parts of the U. S. and in Canada. The group, under Chairman C. O. Stilwell, will provide visitors with interesting business sessions, informative speeches and entertaining social events.

"Widen the margin," theme of the national get-together, won the praise of NWSA President E. C. Caluwaert and other officers as a particularly timely theme in view of reported cost increases and profit reductions among Association members.

Officers to be Elected

A new slate of officers will be elected at the conclusion of the New Orleans convention. Mr. Caluwaert will present a resume of NWSA achievement during the 1955-56 year in his President's Address at the opening session on March 20.

Also among the speakers on Tuesday are Robert Gadberry and Gene Flack. Mr. Gadberry, assistant vice president of the Fourth National Bank of Wichita, will tell the story of a "Twentieth Century Samson."

Sales counsel and director of advertising for Sunshine Biscuits, Inc., Mr. Flack will tell convention visitors that "The time is now."

The first day of the convention will be devoted solely to registration. NWSA business will not be discussed formally until Tuesday so that members may conduct sales meetings with their distributors.

Contact Booth Program

Scheduled for the seventh time, the NWSA contact booth program will occupy members through the afternoons of Tuesday and Wednesday. Approximately 100 manufacturers of welding equipment and supplies are expected to be registered for this program.

A talk in conjunction with a panel discussion on "How to lower operating costs" will be a feature of the Wednesday morning business session. Giving the talk is A. L. Makle, manager of the organization department of the California Co.

Serving on the panel are NWSA members W. P. McLendon, Keenan Welding Supplies, Albany, Ga.; G. G. Garman, Purity Cylinder Gases, Inc., Grand Rapids, and R. S. Mars, Jr., W. P. & R. S. Mars Co., Duluth.

Formal business meetings will be concluded on Thursday morning, March 22, with a general session to which members' wives have been invited. Speaking at this meeting, during the course of which new officers will be elected, are William Gove and Frank W. Lovejoy.

Mr. Gove is vice president and sales director of EMC Recordings Corp. His topic is "You make the difference." A marketing executive of Socony-Mobil Oil Co., Mr. Lovejoy will speak on salesmanship.

Night (and Day) Life

So that convention delegates and visitors may have an opportunity to relax and meet each other away from the convention floor, social events have played an important role in the over-all convention plan.

For all who attend the meeting, there will be an outdoor barbecue at the New Orleans Country Club on Tuesday. A New Orleans jazz band, accompanied by folk singers, will be a prominent feature of this informal event.

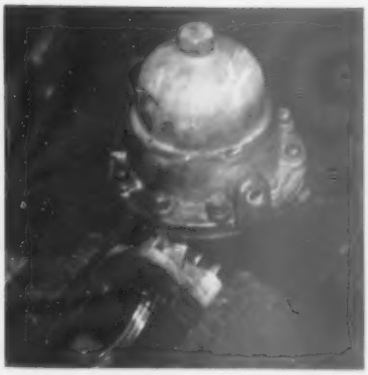
On Wednesday evening, officers and directors of NWSA will receive visitors before the formal banquet and dance in the International Room of the Hotel Roosevelt.

For Ladies Only

A special entertainment program has been devised by the convention committee for those wives who accompany their husbands to New Orleans.

A Monday afternoon cruise of New Orleans harbor on the yacht *Good Neighbor* begins that program, and the excursion will be followed on Tuesday with a visit to the famous French Quarter. This tour of the city's oldest section ends at the Court of Two Sisters, where the ladies will have luncheon.

Wednesday's social program begins with a luncheon at Commanders Palace, continues through a tour of four homes in the Garden District, and concludes with a tea at the Louise S. McGehee School.



1—Located flaw in casting should be marked with chalk, file or chisel to prevent obliteration by handling.

2—Holding casting in vice, file or grind the flaw horizontally so filler metal will not spill from groove.

3—Do not grind through casting wall. Remaining parent metal will prevent filler from dropping inside.

7—Build up thoroughly tinned groove with filler metal by holding flame on the end of the rod.

8—Cooling can be done with a thin stream of water—like that flowing from this wet rag.

9—File or grind away all surplus metal. Torch cleaning may overheat casting and cause collapse.

Applying heat to a zinc die casting is admittedly a tricky operation—but it can easily be done when you develop the proper touch. *Why not follow the author's instruction and save unnecessary replacement costs?*

Soldering flaws in zinc die castings

BY H. C. PHELPS

SMALL castings used on automotive equipment are often made of zinc. Many of these castings are used on fuel pumps and carburetors and, after years of service, they sometimes develop leaks.

Leaks usually are caused by pin holes that allow gasoline to seep or spray over the engine. Such leaks are both costly and dangerous.

Seldom are castings cracked to a point where they need extensive repairs. It is usually a pin hole, and parts can easily be repaired with an oxyacetylene torch.

Here is a simple, easy method that has been used many times to put castings back in service.

Necessary equipment includes a small tip for the oxyacetylene torch and a length of ⅛ in. or, better, ¼-in. filler rod composed of 60% tin and 40% zinc. A wire brush and a clamp or vise to hold the part also will be helpful in the operation.

Zinc melts at approximately 700F, and at no time before it melts will it show the slightest color.

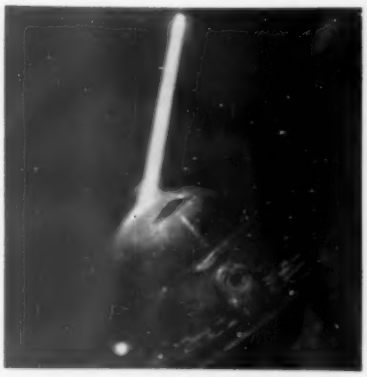
Danger of Overheating

The tin-zinc filler metal melts at 450 F, so the weldor has ample leeway between the two different melting points without much danger of the part collapsing. However, if the part is overheated it will become mushy and, when wire brushed, will cave in!

If at all possible, mark the spot where the casting leaks before removing it from the engine. If this can't be done, remove it from the engine and strip it of all accessory parts.

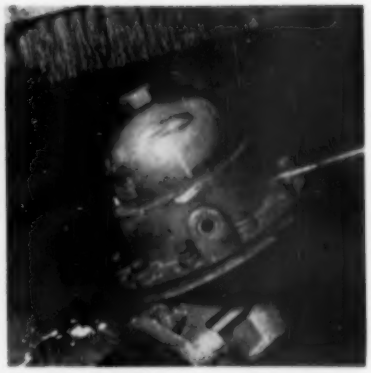
Be sure to remove all traces of gasket material, which will smoke and burn when the casting is heated. Fumes are always exceptionally annoying to the eyes and nose of the torch operator.

Soak the part in carbon-tetrachloride or some other degreaser of

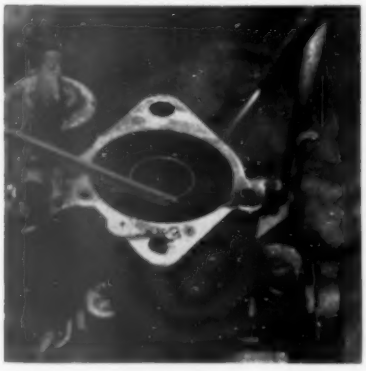


4—Using oxyacetylene flame, apply preheat to each side of groove. Do not direct flame into the groove.

5—Maintaining torch heat, rub tin-zinc alloy back and forth in groove for good deposit.



6—Surplus filler metal is wire-brushed off casting. Shiny appearance indicates proper tinning.



10—Other damaged surfaces may also be built up with tin-zinc filler metal using same procedure.

equal cleaning quality. If the flaw or hole cannot be pinpointed exactly, blank off bolted and threaded connections and fill the casting with kerosene. Using an air hose, build up pressure in the casting. Kerosene is non-explosive and will seep through very fine holes and cracks.

When the trouble spot has been located, mark it well with a chisel, file or chalk so it will not become obliterated from handling. Be sure to remove the blanks so fumes won't ignite when the part is heated.

Groove Flawed Area

Grind or groove the flaw with an abrasive wheel or file. (Then make certain that zinc particles imbedded in the grinding wheel are removed before further pre-weld grinding on steel.) Do not grind the casting wall all the way through. Leave about 1/16 in. of the parent metal to work with.

Have the torch, wire brush and tin-zinc rod handy. Clamp the casting firmly, but *not* under too much pressure. It may cave in when heat is applied. When the part is firmly fastened, start heating.

Apply heat locally around the ground spot on each side of the groove. Start rubbing the filler rod lightly back and forth in the groove. Apply heat to each side of it until the rod starts to tin or melt from contact with the casting.

When the rod melts from contact with the base metal, remove the rod and wire brush the surplus melted alloy all along the ground surface of the groove. Continue this process until the groove is completely tinned (shiny or silvery looking).

In the next step, hold the torch and rod about ¼ in. from the casting and melt a small amount of metal from the end of the rod. If the groove is properly tinned, this melted alloy will flow easily along the surface.

Continue to add alloy until the spot is filled completely. If the filler does not flow easily, wire brush the groove again and continue to do so until the part is thoroughly tinned.

Controlling Alloy Flow

If the part has a curved surface plaster some wet asbestos or refractory material such as pumice or carbon paste at each end of the groove. This will keep the alloy from flowing away.

If too much alloy has been built up above the surrounding surface, allow the metal to solidify and grind it away. Any attempt to melt it away may only overheat the casting.

After the alloy has solidified, quench the casting in cool water and test it with the same method suggested for finding the flaw.

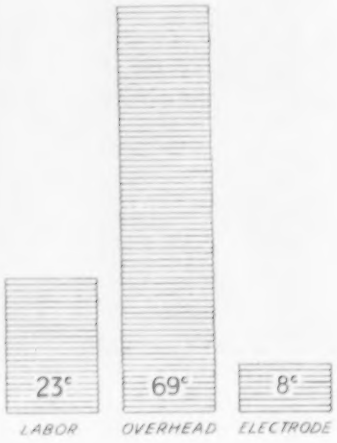
If repairs on large quantities of castings are planned, the operation can be speeded up merely by drilling the hole larger. It should be drilled to ½ or ¾ in. in diameter and contoured so the operator can revolve the rod easily around the hole. In this way, it will tin to the surface, leaving no pockets and eliminating the wire brushing operation.

If the right amount of filler metal has been added and the surface is properly tinned, the casting should withstand a pressure of 1,000 psi. It is unnecessary, however, to subject them to this pressure.

Small zinc castings normally do not warp perceptibly and, since thick gaskets usually are used to connect them to other parts, distortion is not a problem. Because flux is not required for a repair with the tin-zinc alloy, post-weld cleaning is unnecessary.

The high tin content of the filler metal makes the weld corrosion resistant to any fuels. Once a casting has been repaired and made pressure-tight, it is actually as good as new.

"IT'S SOME SORT OF CUTTING CONTRAPTION, I BELIEVE."



GRAPH at right shows fractions of the average standard coated-electrode welding dollar.

Greater time and dollar savings with:

Production welding controls

BY REX CLEVELAND

THREE items enter into the cost of every steel production weldment —material, labor and overhead. Of these, base metal cost alone is inconstant.

Costs of electrodes, labor and overhead will vary slightly with different manufacturers, but the proportion of the total cost of production welding which each represents will be about the same.

About $0.02 of the overhead figure consists of power; about $0.04 covers the investment in equipment. This leaves $0.63 for other overhead, such as supervision, taxes and clerical help.

These figures make it pretty obvious that saving on electrodes, equipment or power consumption is not very effective. Shopping for cheaper electrodes, burning them to shorter stubs, fusing stubs to new electrodes may result in costs exceeding economies, or in reduced weld quality.

Purchasing lower-cost equipment, or using old equipment beyond its efficient life may do the same. Power consumption differences between a-c and d-c equipment are very slight, and insisting that weldors shut off their machines when not in use may cost more than it saves.

Actually, the use of more expensive electrodes, with more costly equipment which may use more power, can effect economies which completely overshadow increased costs.

Overhead Reduction

Since 69% of the standard, coated-electrode welding dollar lies in overhead, cutting overhead cost seemingly would effect welding costs most radically. This is a management problem, however, which cannot be attacked from the level of weldment production.

The best method of reducing overhead is to increase the proportion of manufacturing production to the cost of factors which make up the overhead figure.

Note that overhead is three times the direct labor cost—a pretty good average for most factories. It is this figure which is used by the cost accountant in calculating factory cost of a product, added to the cost of material.

Overhead *percentage* is constant. For every penny of labor, three pennies must be added for overhead. Since the labor figure is $0.23, this means that 92% of every welding dollar is dependent upon the efficiency of direct labor involved in producing the weldment.

Here, then, is the place to expand most of our economy efforts, for 92% of welding cost is dependent upon the amount of quality welds produced by weldors.

Economy Measures

It is possible, by extreme economy measures and pinch-penny purchasing, to lower electrode, equipment and power costs as much as 10%. But these items combined represent only 14% of the welding dollar.

Economies effected by increasing the efficiency of direct labor are another matter. Cost reductions of up to 25% of the welding dollar can be effected when proper methods and procedures are applied.

Electrode size greatly affects welding speed. The size selected should produce maximum speed for that type of joint with weld strength equal to the weaker of the two parts being joined. Electrode size also may be dictated by weld position.

When high-carbon or alloy steel is to be welded, special electrodes designed for these applications must be used. In addition, AWS standards frequently are not met exactly by

different electrode manufacturers. Some are not as good, some are better. Special high-carbon or alloy steel electrodes are never related to these standards.

Pre-Weld Tests

As a consequence, it is wise to make conclusive speed and quality performance tests before selecting an electrode for production welding. Small electrode faults are quickly magnified by long welding runs.

Electrode types are many and varied, but AWS standards classify them pretty positively. Recommended procedures specify both type and size required to weld each plate thickness, type of joint, welding position and proper fit-up gap. Departure from these procedures almost inevitably will result either in loss of weld quality, reduction of speed or both.

Large electrodes cannot be used for vertical welds without getting bad results. Electrodes designed for mild steel produce weak welds on high-carbon or alloy steels.

Electrode specifications are always the best guide to the correct rod for each job. Cost losses up to 50% can result from improper selection of electrode type, so follow the manufacturer's recommendations.

Electrode size selection is as important as type, though size is related more closely to speed than to quality. Sizes specified by manufacturers are proper for maximum welding speed and highest quality welds. Adherence to these sizes means economical welding; departure means increased costs—often as much as 100%.

The same factors apply in selecting electrodes for gas-shielded arc and automatic submerged-arc welding. Quality drops and costs increase when an incorrect electrode is used.

Contact Electrodes

The recently introduced powdered-metal-coated contact electrodes have performance characteristics particularly adapted to economical welding. They are not the "all-purpose" answer to the weldor's prayer, but they are somewhat more versatile than other coated electrodes, and much faster.

These contact electrodes are not designed for overhead welding, and do not perform as well as E6010 or E6012 electrodes on vertical welds. But in downhand horizontal or flat welding positions they outstrip any other electrodes for speed, giving deep penetration and very high weld strength.

Contact electrodes require no "manipulation" of the arc. They are "drag" type electrodes, requiring only that contact with the work be made and maintained. If current setting and angle of electrode inclination are correct, the rod just melts off and flows into the joint. All that is necessary is to keep the arc slightly ahead of the molten puddle to produce a good weld.

Self-Maintained Arc

In this electrode type the arc is self-maintaining. The rod burns off quite deeply into the flux coating, forming a deep crater in the end of the electrode.

Oxidation of the end of the powdered metal and flux coating makes it a conductor at this point. The arc, therefore, can be struck instantly without breaking away a coating. This is a big time saver in production welding.

The experienced weldor finds no difficulty in converting to the use of the contact electrode. Its use simply makes his job easier. He can turn out much more welding with less effort in the same length of time.

In addition, weld deposition rate of contact electrodes is much higher than other types. This is because the coating contains powdered iron which enters the weld and fuses with it. Smaller electrode sizes may therefore be used in most cases to produce a weld of required size at much greater speeds.

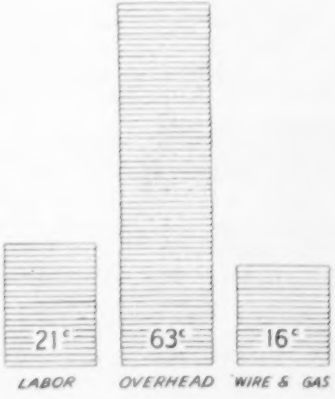
The contact electrode eliminates a good many variables which cause the largest share of excessive welding costs. This electrode produces practically no spatter, and the slag it leaves is self-cleaning. There is a slightly concave weld bead, with a smooth surface and deep penetration.

Special Training

No matter how much training an operator in a production welding shop has had; no matter what welding school he has attended; no matter how much experience he has behind him or how much priority he has in his union, he should be re-trained in the procedures, methods and standards of the shop in which he is employed.

If he cannot produce quality welds at designated speeds when following recommended procedures, he is not up to the standards required for economical production welding.

The cost of allowing a weldor to become acclimated to requirements peculiar to any production welding shop will be much greater than the



BREAKDOWN of the average gas-shielded arc-welding dollar is shown in the graph at left.

cost of a concentrated period of retraining.

Flexibility should keynote layout and operation in the modern production welding shop. A rigid shop layout, with all equipment and welding tables fastened down, or with fixed-position welding booths, does not adapt itself readily to very many production welding problems.

Such arrangements may work well if the same items are being welded year after year, without change, but a great cost burden is placed on any other weldments which may be processed through the same department.

Easy Access

A layout with portable (or at least movable) equipment, tables and screens imposes no such burden on any type of job, whether short run or large.

Proper electrical outlets should be systematically placed wherever it might be necessary to use them. One should be within easy reach wherever it might be necessary to place welding machines.

Electrode racks should be handy, but out of the way. Of course, automatic welders must be stationary, but should be located where the flow of parts and finished assemblies will be as convenient and rapid as possible.

Overhead chain or power hoists should be provided for handling parts or assemblies too large or too heavy for one man to lift and move continually without fatigue. Depending upon requirements, welding positioners should be available.

Everything possible should be done to create an arrangement where the weldor does nothing but weld.

Increased Efficiency

It is possible to increase shop efficiency 10% just by making parts, electrodes, and the unloading of fixtures handier for the weldor. Another 10% can be lopped off costs by using helpers to load and unload fixtures, and to clean off slag on multiple pass welds.

This is a 20% savings, which means that the $0.035 per-inch cost of a ¼-in. fillet weld would dwindle to $0.0264 plus $0.0019 for electrodes —a total of only $0.028.

Here is a saving of $0.007 per inch, or $0.84 per foot of weld. At 20 ft per hour, 8 hours per day, 40 hours a week, for 50 weeks a year, the saving would be $3,360.00 on the labor of just one weldor every year. This is almost enough to pay his salary!

Some form of standardized procedures should be adopted and used by the welding shop as well as by Design, Processing, Tooling, and everyone concerned with welding. The simple symbols used on welded assembly drawings then become the guide upon which all welding in the shop is based.

This practice leaves no chance for misinterpretation. All costly variables are eliminated and no favorite individual method can alter weld quality or increase costs. All the weldor need do is place parts in the fixture and weld!

Standardization

The shop must see that these procedures are followed to assure standard results. The foreman or set-up man must "freeze" the machine at a correct setting on each job.

Inspection must constantly check burn-off rate (or inches of weld deposited per minute) and fillet sizes to insure standard weld strengths. Weldors must be supplied only with the proper electrode type and size for the job. And they must hold a proper electrode angle and maintain the right speed.

Weldors who consistently produce faulty welds must be made to re-do or repair them without extra compensation, whether they are on hourly incentive or piece-work rates.

The weldor's labor is usually the most expensive in the plant. Not because his hourly pay is higher, but simply because production welding has not reached the efficient plane on which most other types of labor stand.

100% Inspection

Inspection plays a large part in control of both welding cost and quality. It is concerned with weld size, weld appearance, weld strength and cleaning.

Welds should be inspected on a 100% basis for these factors. The appearance of a weld can tell the inspector a great deal about quality. A bad looking weld is generally a weak weld.

Convex fillets are either over-welded, or are indicative of poor penetration. Pitted welds are usually porous and weak, or are full of slag inclusions.

Cracks naturally mean weak welds, but are sometimes very difficult to see, even after slag is removed. Unevenly spaced ripples on the weld, or beads of varying width, indicate irregularity in welding speed and make the weld alternately weak and strong.

Undercuts at the edges of welds are usually caused by too long or too strong an arc, or both, and result in weakened joints for undercuts are stress-raisers.

An Exception

Fillet welds are weak if they do not have equal legs on both plates. Both fillet and butt welds are over-welded if they are convex, unless the butt joint is plain, in which case the build-up should be only slight.

In some cases where a large rod with high current and fast welding speed has been used in the downhand position, the fillet may be concave and undersize. Yet it may be stronger than a full-size fillet, due to greater penetration. Welds should be checked with gages.

Oversize fillets should not be rejected, unless proven weak, but the practice should be corrected to keep welding costs down.

Slag *must* be removed between passes on multiple pass welds, however, and inspection should spot-check this step continuously to make certain it is done. The result of leaving slag in these cases will always be weak welds.

Since surface inspection of welds is not fool-proof, spot checking by strength tests must be a part of the inspection program. The AWS has set up specifications and procedures for properly conducting these tests, and they should be followed to the letter for positive results.

When weak welds are uncovered in a production run of assemblies, further checking is indicated and re-welding may be necessary to insure strong weldments.

Inspection is the quality control medium for welding. Cost savings resulting from proper weld inspection are of primary importance.

The primary function of Welding Inspection is to check on Production's adherence to the specifications of Engineering. If this is done properly and conscientiously, higher weld quality will result and considerable cost savings may also be made as an important by-product.

A welding clinic marks distributor expansion

A WELDING clinic and an open house was the way that Wayne Welding Supply Co., Inc. of Fort Wayne, Ind., chose to call attention to the 100% increase in floor space made available by a new building extension.

Formed in 1919 as a job shop by James M. McClure, Wayne Welding Supply is now exclusively a distributor, serving mostly industrial accounts within a 100-mile radius that includes portions of Indiana, Michigan and Ohio.

Twelve of the 60 manufacturers of welding equipment and supplies represented by the firm were on hand to conduct demonstrations during the two-day clinic. It was a "do-it-yourself" affair, and visitors were invited to try their hand at new techniques and to test new equipment.

Arc welding equipment, gases and gas equipment comprise more than 90% of Wayne Welding Supply's regular product line, and all of the major items to be found in these categories were displayed at the clinic.

Even a 5-in. snowfall failed to keep the people pictured on this page from learning more about welding, flame-cutting and allied processes.

BELOW: Hardfacing demonstration was conducted by Stoody representative L. J. Sadowski (right) for an interested audience.

AMISH visitors (in black hats) came from settlements around Fort Wayne to view latest in welding developments. Alvin H. Fick demonstrates some All-State products for these men, who usually run a blacksmith and welding shop for their area.

RIGHT: Demonstration by Wayne Smith of Bay State Abrasive Co. won the undivided attention of Norman Siberry of American Tractor Corp., Churubusco, Ind., and Cliff Schlatter, Schlatter Welding & Repair, Fort Wayne.

BELOW: Warehouse section of building contained this manufacturer's booth where an arc-gouging torch (not visible) was being demonstrated by E. J. Lehmkuhl for this group of visitors.

HAVING completed a demonstration, Ted Diehl, district manager for Alloy Rods Co., explains the results to his audience.

The personal touch sparks a popular welding clinic

QUIETLY busy 360 days each year (top), Welders Supply Service Co. suddenly "expands" (below) during 5-day welding and hardfacing clinic.

WELDERS Supply Service Co. was started by Otto Koll in Modesto, Calif., 10 years ago. Limited capital was an initial hindrance, but a sound job of salesmanship and service has put the firm in a top-notch competitive position.

An effective truck delivery and service force, plus salesmen who track down leads and dig up new accounts certainly can take a big share of the credit for 10 years of successful operations. But for grass roots selling of the *theory and merits* of welding, Welders Supply Service points with pride to its annual welding clinic.

Modesto, in the midst of rich farmlands and vineyards, has roughly 18,000 inhabitants who rely heavily on farm produce for their livelihood. Both townspeople and farmers have that healthy, urban desire to get together periodically for some useful purpose, and Otto Koll's welding clinic gratifies this urge in a very profitable manner.

Holding open house for five days at its most recent clinic, Welders Supply attracted an estimated 2,000 people with an interest in welding. Some came to buy, some were "just looking"—and several picked up holder and helmet and settled down to *learn!*

Several major producers of welding supplies and equipment had representatives on hand to help Welders Supply employees with demonstrations and sales talks. Sandwiches, coffee, pop and other refreshments put visitors in a friendly frame of mind and—well, just see for yourself what happened.

TAKING a rare break during the course of the clinic is a manufacturer's representative (left). He has just hardfaced carrier roller on floor for customer. Many customers did their own welding on the spot.

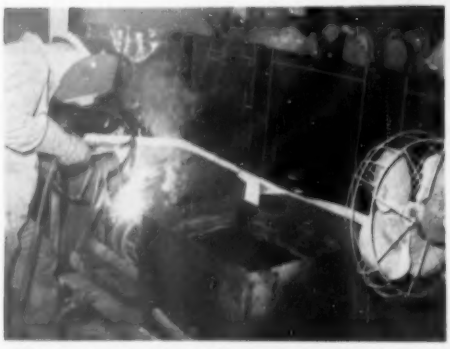
NIGHT or day, there was never a lack of an audience at welding demonstrations.

DISPLAY effectively compares hardfaced and non-hardfaced farm equipment parts. Brought in from local farms, parts were all subjected to same wear factors. Hardfacing advantages were obvious.

—Photos courtesy Rankin Mfg. Co.

PRACTICAL owner of the wornout vineyard tractor (left) brought it to the clinic, learned to weld and hardface, finished by rebuilding machine parts.

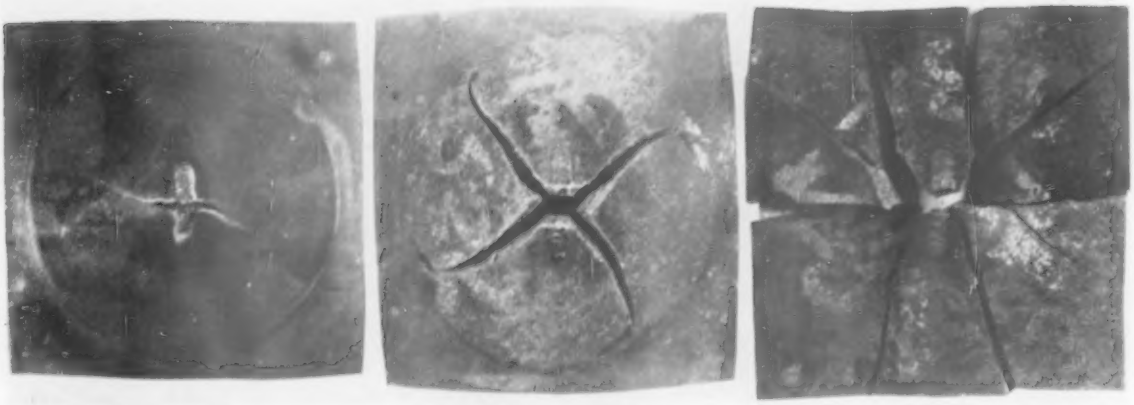
ONE of several booths operated at the clinic by manufacturers of welding equipment and supplies. These well-stocked displays and informative demonstrations drew good crowds.



MANUFACTURER'S representative hardfaces a carrier roller. Water tank at bottom cools lower rollers during welding operation.

HARDFACING demonstrations, such as the one on a tractor roller above, proved so successful that nearly every tractor owner in the area now uses this maintenance process.

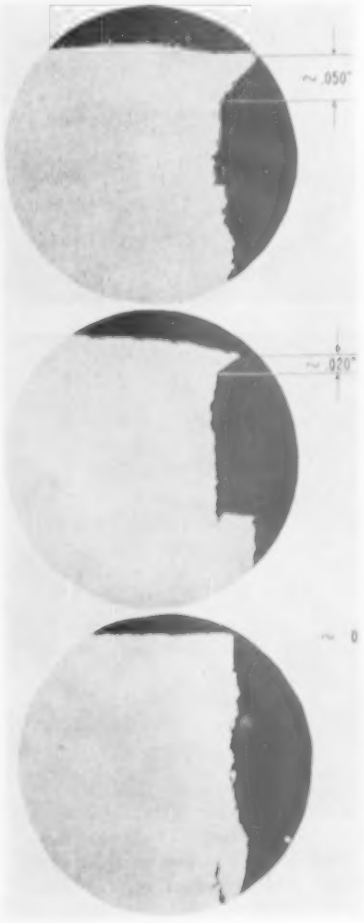
THIS is where Welders Supply Service clinic paid off—at the cash register. More important success is reflected in expressed satisfaction and increased sales volumes through the year.



FRACTURE characteristics of mild steel plates showing relationship of surface shear to fracture propagation. Crack-starter tests were conducted at temperatures resulting in surface shear lips of thin, fin-type (left), approximately 0.030-in. thickness (center) and approximately 0.080-in. thickness (right). (Fig. 1)

Notch-tough weld overlays...

Arrest cracks in mild steel



EXAMPLES of shear lips on surfaces fractured in explosion crack-starter tests. (Fig. 2)

BY P. P. PUZAK and W. S. PELLINI*

EXPLOSION-loaded, crack-starter tests of mild steel ship plate have demonstrated that relative resistance of the steel to the propagation of brittle fracture is related to development of surface shear (shear lip).

At test temperatures great enough to shatter mild steel plates completely, the unaided eye cannot discern evidences of surface shear. Extremely tiny fins, however, are present.

At higher temperatures where plates resist fracture to the extent of limiting cracks to the plastically deformed bulge regions, easily visible shear lips of .020 to .050-in. thickness are developed. Amount of shear lip increases rapidly at still higher temperatures to the point of developing complete shear across the section, and completely ductile behavior is exhibited by the steel.

The authors are in the Metallurgy Division of the Naval Research Laboratory, Washington, D.C. Mr. Puzak is head of the Welding Section; Mr. Pellini is Superintendent of the Division. This article is an abstract of a paper prepared for the AWS Fall Technical Meeting in Philadelphia, Oct. 17-21

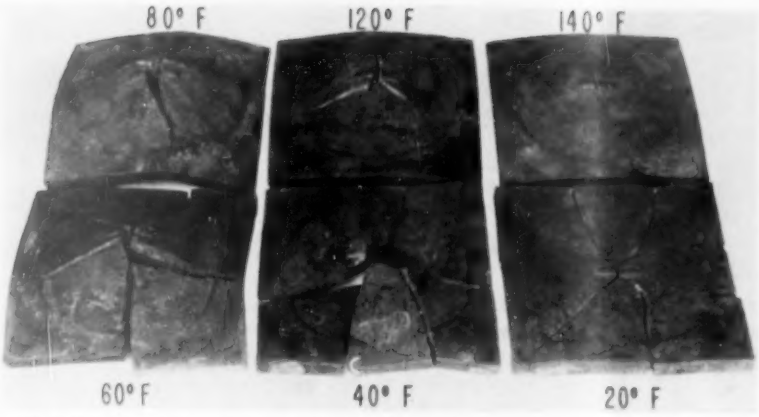
Fig. 1 illustrates fracture characteristics of mild steel plates at temperatures such that surface shear lip thickness, respectively, is nil, approximately .030 in., and approximately .080 in. It is evident that the surface-shearing process controls relative fracture-resistance of the steel. (See shear lips in cross section, Fig. 2.)

Development of surface shear in lip form results from the fact that free surfaces approach a condition of stress biaxiality, compared to the stress triaxiality which may be developed in the inner regions of thick plates.

Resistance Factor

Thus, if steel is tested over a range of temperatures involving a transition from complete brittleness (total cleavage of fracture surface) to complete ductility (fracture surface entirely shear), the first portion of the fracture face to show ductile behavior is naturally the free surface region of lowest stress triaxiality.

The important point is that a relatively minor thickness of surface



EXPLOSION crack-starter tests of mild steel plate material used in the investigation. (Fig. 3)

shear lip imparts a large measure of resistance to the propagation of high-velocity, brittle fractures.

The discovery that propagation of brittle fracture was controlled by energy absorption accompanying the development of small amounts of surface shearing suggested the possibility of cladding mild steel plates with notch-ductile material. This, it was felt, would provide an artificial region of surface shear.

Overlays of highly notch-ductile weld metals were considered as a practical method of cladding. Previous studies of the notch-ductility characteristics of weld metals pointed to the use of ferritic E120-15 and austenitic 25-20 electrodes for this purpose.

A mild steel plate, 1 in. thick, was used as the base material for all tests. Fig. 3 illustrates fracture characteristics of this material in explosion crack-starter tests.

Weld metal Charpy test V-notch specimens were machined from double-vee butt welds, and plate specimens were machined in a conventional manner: longitudinal axis of specimen parallel to primary rolling direction of plate, and notched through the thickness.

From known correlations with Charpy V tests, mild steel chosen for tests would be expected to be highly brittle at temperatures of 20 to 40 F, but the weld metals used in the overlay studies should theoretically be ductile at these temperatures. Tests of weld-overlay plates were conducted at 20 to 40 F.

This temperature range was considered most interesting, since it represents the temperature range in which the most severe damage was done to wartime ships using steels of similar crack-starter-test fracture characteristics and Charpy transition features.

Testing With E120-15's

Initial tests using E120-15 electrodes were conducted with samples featuring ⅛-in. machined recesses. Both plate surfaces had then been built-up with weld metal to their original plate thickness.

All welding was started at room temperature preheat, and continued by maintaining a 100 to 200 F interpass temperature. Fig. 4 depicts test results at 20 and 40 F for three types tested.

At these temperatures, unwelded portions of the plate fractured readily but overlay portions of the samples served effectively to arrest brittle cracks.

The tendency of the plate to exhibit fractures at these temperatures suggested the possibility of a stress-unloading mechanism which would preclude full evaluation of the crack-arresting properties of the weld overlays.

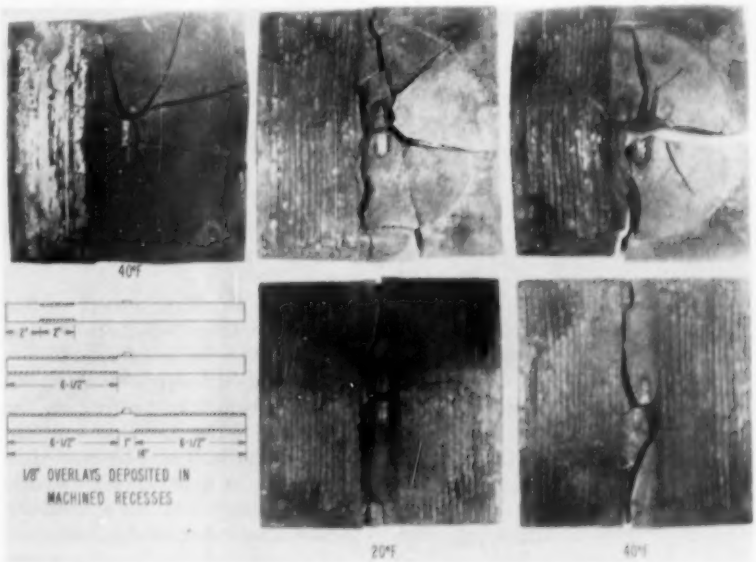
In addition, machining of grooves or recesses in welded structures was not considered practical. Consequently, the balance of the investigation was limited to studies of samples featuring bead-on-plate weld overlays.

Bead-on-Plate Stops Cracks

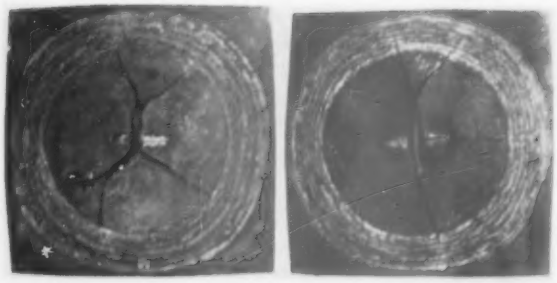
Further tests were performed with samples featuring 2-in. circular overlays, on both plate surfaces, around the periphery of the test-explosion area. Fig. 5 illustrates the results of these tests.

A comparison with the prime plate samples clearly indicates the effectiveness of the bead-on-plate overlays to arrest brittle fractures at 20 and 40 F. In the case of the circular welds, there could be no relief of the applied load by preferential cracking to one side of the plate. This was a considered possibility for initial tests.

In these tests, conditions allowed for development of a rapidly-running brittle crack with subsequent impingement in the weld region. This determined the effectiveness of bead-on-plate overlays in stopping brittle cracks.



RESULTS of initial crack-starter tests of specimens featuring E120-15 weld deposits in machined grooves. (Fig. 4)



CRACK-starter tests conducted at 40 F on mild steel plate with an E120-15 circular weld overlay (left) and a 25-20 circular weld overlay (right). (Fig. 5)

FULLY-clad E120-15 (top) and 25-20 (bottom) weld samples show results of standard crack-starter test (left) and effects of a test with increased energy. (Fig. 6)

Effectiveness of weld overlays in stopping cracks is credited to a "shear-drag." This develops as surfaces of the propagating crack generate heavy shear lips on entering the notch-ductile overlay zone.

It is believed that additional studies are required to establish optimum widths of overlays necessary at various locations in welded structures and for various thicknesses of plates.

The mechanics of the process suggest that the overlay width should be a function of plate thickness and relative crack-front acuity, if resurfacing of the crack to the other side of the overlay is to be prevented.

Fracture Initiation

Additional tests were conducted to determine resistance to fracture initiation in the presence of weld overlays. For these tests, ⅛ in. was machined from each surface of the mild steel plate.

Samples, consisting of a core of brittle ship plate with surfaces of notch-tough weld metal, were prepared by fully cladding both surfaces with a single layer of interlocking weld beads. The brittle crack-starter weld was then placed on top of the clad surface and samples were tested at 40 F.

In addition to the standard explosion-loading condition test (in which off-set distance and weight of explosive are adjusted to obtain only moderate bulging) other fully-clad plates were tested with charges of increasing load to develop gross deformation.

Fig. 6 shows the results of these tests for fully-clad plates with both E120-15 and 25-20 weld overlays.

Test results demonstrate that cladding a brittle steel with notch-tough weld metal imparts a high order of resistance to the initiation and propagation of brittle fractures.

The improvement in properties of the steel is derived from the presence of this surface layer of metal which fractures in a shear fashion at temperatures which would have caused the surface layer of the base plate to fracture in a brittle fashion.

The change in the fracture mode of the surface from cleavage to shear precludes initiation or propagation of high-speed fractures.

Cladding Possibilities

If the entire surface area of large plates could be clad in this manner, the ductility of the steel would be very high at all temperatures at which the cladding fails only by shear.

General cladding for this purpose may be considered practical for relatively small structures; however, it would not be economical for large structures. The major question raised by these tests involves the value of cladding when limited to small regions of large welded structures.

If it is granted that high-speed fracture must terminate in structural regions where there is steel of surface-shearing quality, the question then is one of "how much" of this steel is needed in the path of the crack to prevent the fracture from crossing to the other side and continuing on to cause ultimate failure of the structure.

There is no single answer to this question because load characteristics of structures must be considered.

For example, failure of the strength deck of a ship may so overload the remainder of the hull that a notch-ductile plate insert may be crossed in shear (due to high tearing forces), and the brittle fracture may continue on the other side of the insert.

Obviously, an overlay of narrow width could not be expected to "hold the ship together" after the fracture has progressed across the strength deck.

The value of notch-tough overlays, or inserts of notch-tough steels, lies either in prevention of fracture initiation, or in stopping fracture propagation following short runs. The application of the overlay method, therefore, should be aimed at protecting points of connection or discontinuity—the usual points of initial failure in large welded structures.

Over-all cladding of such positions should be used whenever possible to prevent initiation. Where this is difficult or impractical, a ring-like cladding very close to the point of possible initiation is suggested as a crack stopper.

The method is considered practical either for existing or new structures, and for emergency repairs in the field aimed at stopping the progress of short cracks.

The authors acknowledge the support and interest in this investigation of Mr. T. Griffin of Code 582, Bureau of Ships.

Here's how to make a slow day pay . . .

LIKE most smaller businesses, welding-distributor firms have their share of slow days.

Here are a few ideas on how you can make the most of that occasional slow day—how to make it pay.

I—Study Your Sales

"It is true," one executive said, "that in nearly any organization, one type of work will produce an out-of-proportion share of volume and profits. The plan here is to utilize slow days for *trend* studies—to obtain a current guide for effective sales promotion on the days when conditions beyond our control slow things down."

II—Analyze Jobs

In these days of high-costs one of the few remaining ways to reduce overhead is to improve the work that individual employees perform. Large companies can afford aptitude tests. Smaller ones can do nearly as well with job analyses—the kind that can be handled on a rainy, slow-sales day.

What is a job analysis, and how do you conduct one?

All you need for analyzing a particular job are a few sheets of paper, a pencil, and an idle hour or two. First, list the jobs. Then break down every function of each—every step the employee is required to do, including, if the job calls for it, emptying waste baskets at the end of the day.

When analysis sheets have been made for each job, including your own, study the possibility of shifting a job from one man to another to improve efficiency. Study whether each man is in the work he is best fitted to do, or whether the load might not be juggled around in order to make every employee something more of a specialist. Personnel counsellors frequently call this assembly-line assigning, after the manner in which specific tasks are allotted to production workers.

III—Improve Warehousing

Here is what warehousing experts say can be done to streamline operations (and reduce wasted time):

Begin by setting up a location system. Everything has a definite place, and related items should be together.

Next, plan for efficient flow. Things should come in one end and move in a straight line toward the point of final use, with no criss-crossing or shifting around.

Finally, educate all employees to the plan.

"We found," said one shop owner who recently set up such a warehouse-streamlining plan, "that the time employees spent *looking* for an item was reduced by about 60%. We added several hours a week to our schedule without extending the closing time by a single second."

IV—Answer Inquiries

Often the questions, complaints and the recommendations that come in aren't answered as quickly as they should because of the press of work. A quiet day is an excellent opportunity to dictate answers to letters. *Prompt* attention, however, to a customer's correspondence will indicate to him how highly he is valued.

V—Read Business Publications

Business magazines (like WELDING ENGINEER) are the idea exchanges of every industry. "It is seldom that I don't run across at least one good, usable idea in every issue," the general manager of a large Southern company said recently. "It may be in the field of sales, it may be an example of a really courteous letter, it may be an operational idea that reduced costs. And it *may* work for me!"

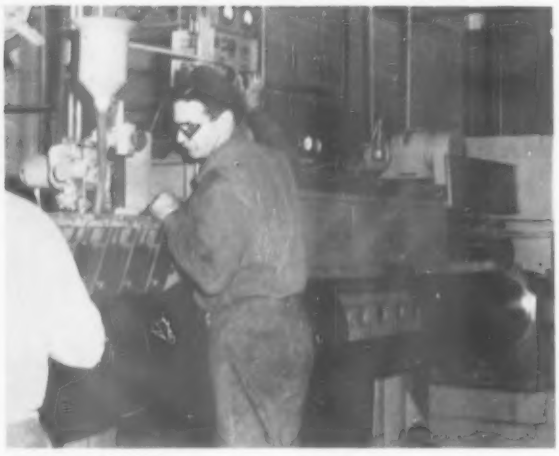
MAKE an analysis of each job

STREAMLINE your warehousing

READ trade and business publications

Automated welds lead to improved water heaters

Submerged-arc and resistance welding are combined in this assembly operation to make a quality product.



1—OPERATOR controls speed of shell assembly as it progresses under submerged-arc welding head. In background is roll-forming machine with shell being fed onto boom projecting from welding station.

BY F. T. TANCULA

THE WORLD'S largest producer of hot water heaters for household and commercial use is Rheem Mfg. Co., and this leading role can be attributed at least in part to its main production tool—welding.

Rheem has made innovations of its own in equipment, and assembly-line production of the inner-tank heater assemblies is automated welding at its finest.

But progressive-minded companies are never satisfied, and that feeling is evident at Rheem. The unattainable goal of perfection will always call for further refinements and improvements in equipment and joining processes.

2—PROFILE view of the "Southern jig" welding station, showing shell's longitudinal seam being joined. Note spout of flux-recovery system.

Forming Machine and Welder

The latest step in this program has been the installation in three of Rheem's plants of a large machine, known familiarly to workers as the Southern jig. This device combines a roll-forming machine and a submerged-arc welding station (see Photo 1).

At the Chicago plant, flat sheets of SAE 1010 (mild) steel are fed into the forming end of the huge machine. An entirely automatic operation forms the sheet into a cylinder, then feeds it onto a boom that protrudes from one end of the welding station.

As a result of passing over a Z-bar, edges are placed in alignment and kept slightly apart. As the formed steel passes onto the mandrel, roller wheels force the tank shell edges together, to make them butt up against each other.

More knurled drive wheels move the shell under the stationary welding head, where a single, smooth bead of better-than-average appearance and strength is laid down at the average rate of 100 or more inches per minute. As the shells pass *under* the head, they pass *over* a water-chilled back-up bar.

To eliminate the problem of starting and stopping, the feed chain butts one shell end against another. Thus, the weld is a continuous bead that extends across as many tank seams as desired. Individual shells are lifted with a slight jar as they come off the boom, breaking the connecting weld.

Prior to installation of this device, the procedure at the Chicago factory involved separate forming of the sheet, and manually loading shells onto a fixture with a traveling welding head for submerged-arc welding.

C-P Power Source

Power source for welding this longitudinal seam is a 750-amp, constant-potential type d-c machine. Rheem formerly used a motor-generator set and continues to do so at other submerged-arc welding stations along the line. Welding wire used on the Southern jig is ⅛-in. diameter.

The first installation of the c-p welder with the jig was made in the Rheem South Gate, Calif., plant. There the firm was welding 30-in. seams on 18-gage steel with conventional submerged-arc equipment. But a number of leaks tended to appear at high speed operation.

After installing a 500-amp constant-potential welder and a welding head slightly modified for constant welding-speed drive, a closer control of arc length and operation at lower nominal arc voltages were obtained.

The South Gate plant now has four c-p units for tank work. Use of this type of welding power source has been extended to the Rheem plants at Sparrow Point, Md., and Houston, as well as in Chicago.

After the longitudinal joint has

been made and slag removed, this procedure is followed on those tanks that are to be lined with glass:

The root of the longitudinal bead is ground by moving the tank shell into and out of a stationary grinding machine. Afterwards, the shell is placed on an expander, to produce a true circle section. The shell proceeds to a projection welder where two couplings (later to be threaded) are welded into holes that were punched when the steel was still flat.

Head Joined to Shell

Another submerged-arc weld is made when the preformed head (always of heavier gage than the body) is joined to the shell.

At this point, the head-and-tank assembly undergoes a soap-water and air purge to test soundness of the longitudinal and circumferential welds. Two semicircular hangers are then arc welded to the head for convenient handling.

From here the assembly is moved via conveyor chains to two cleaning stations—a caustic bath and a grit-blast operation. Once clean, the shell assembly is lined with porcelain-enamel and fired at 1,600 F for about nine minutes.

After spraying and drying, but before firing, the porcelain is in powder form, enabling workers to brush clean those parts that are to be threaded (the couplings), or welded (the bottom edge of the shell).

Homogeneous Lining

The bottom assembly, consisting of a flue and preformed flanged disc already welded together and sprayed, is placed into the shell body. A third section, known as a skirt, is submerged-arc welded to the tank assembly to form the combusion chamber.

The bottom assembly and skirt are placed into the shell, tack welded for alignment, then fed into the next submerged-arc welding station. Here the circumferential weld not only joins the three steel components—shell, bottom and skirt—but also fuses the porcelain-enamel lining into a homogeneous mass. The arc heat thus insures a complete lining.

Diameter of the electrode wire used at this and the head-to-shell welding station is 5/32.

At this stage of production, the porcelain-covered flue protrudes several inches through the center opening in the head. This circular joint also is sealed by welding, again utilizing heat of the arc to fuse the porcelain-enamel of the flue and head lining.

"In this operation, we are welding through glass," is the way George Landis, superintendent of boiler production at Chicago, phrased it.

After another soap-water and air test, the inner shell is ready to be assembled into the heating unit, which includes an outer jacket.

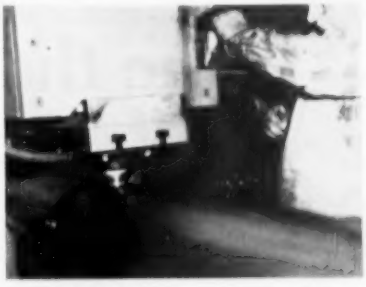
Rheem also manufactures galvanized tanks on this line and the procedure is somewhat similar, with these exceptions:

Instead of getting a caustic bath and grit-blast cleaning, they are pickled, then dipped into the galvanizing bath. The flue-and-bottom assembly on this type of tank is welded into the shell by the resistance process—the workpiece is rotated under a seam wheel electrode.

Carbon-Arc Brazing

The protruding portion of the flue on galvanized tanks is brazed to the head by means of a carbon-arc torch. Of course, on galvanized there is no glass lining to contend with, and the skirt is an integral part of the galvanized tank shell.

3—AFTER slag removal, seam is ground smooth by fixed grinding machine.

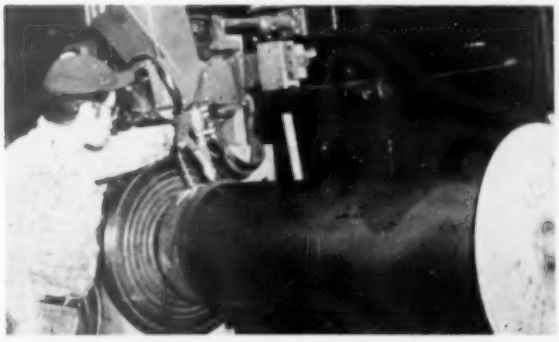


4—RESISTANCE welding process is first brought into production process when two couplings are projection welded to the shell.

Steel for galvanized tanks ranges from 8 to 14 gage. On the glass-lined product, steel for the body shell is 10 to 12 gage, the head and bottom, 0 to 9 gage.

Voltage and amperage settings, which were never formally charted, vary according to welding conditions, metal thickness and welding speeds.

Although not completely automatic, the hot-water assembly line at Rheem Mfg. Co. is an automated operation, and the improvements described have increased potential production capacity more than 100%.



5—CIRCUMFERENTIAL lap weld joins head of tank to shell, again by the submerged-arc process.

6—SHOWER of cold water breaks off still-warm slag; head-tank assembly is soap-water and air purged.

SIDEWALK "supers" ring this work site as an operator applies flame-cutting torch to 3rd Ave. "El" column.

Torches burn brightly as . . .

Flame-cutting crews raze the 3rd Ave. "El"

NEW YORK City's famous old 3rd Avenue "El," in the last stages of its demolition, has to be razed on a time schedule that keeps street obstruction to a minimum and moves scrap iron and steel to New Jersey mills quickly to take advantage of high scrap prices.

Lipsett, Inc., contractors for the job, are employing a favorite tool—the oxyacetylene torch—to cut wrought iron girders and headers from upright columns.

Flame-cut sections are trucked to the Lipsett yards on the Harlem River, put aboard barges and towed to New Jersey. Here they are loaded on freight cars and shipped to the mills where final cut-up and melting are done.

Henry Hanitsch, Lipsett's general superintendent, who has bossed demolition of the burned-out *Normandy* and the battleships *New Mexico, Idaho* and *Wyoming,* acknowledges that many new problems present themselves along 3rd Avenue.

Ever-present sidewalk superintendents stand just a few feet from torch operators and cranes; traffic at cross streets must be kept moving, and a virtual army of men and equipment, stretching from 3rd Avenue to New Jersey, must be kept busy.

WORK is accomplished with as much speed as possible. Crane swings girder onto truck for journey to Harlem River barge, then to New Jersey steel mills.

New Equipment

Practically every item of importance used in dismantling the "El" structure was purchased new for the job. This includes 20,000 ft of hose, steel cable slings and 40 3-ft oxyacetylene torches. All hoisting equipment on the job has a rated capacity far in excess of the demands placed on it—a studied attempt to keep accidents and lost time at a minimum.

An average "El" section above 14th St. is 44 ft 6 in. long, and requires 28 separate cuts. The main work force is preceded by preliminary flame-cutting crews which cut girders at an angle so they can be lifted but cannot fall. Only three torch operators do the actual severing when the crane is in position to hoist a free section.

Other Metals Found

For most of the work, standard gas tanks on two-wheel carts are used, but on such large jobs as the multi-storied station at Chatham Square, oxygen and acetylene were supplied from manifolded cylinders. One hose from the manifold supplies four torches.

Although a large part of the original "El" structure is made of wrought iron, other types of ferrous metals have to be dealt with. Late structural

steel additions, steel rails, copper and cast iron bases and traffic bumpers at the foot of each upright column all present a special problem. Pipe of all sizes and lengths has been reclaimed and, of course, thousands of wooden ties have had to be removed from the structure.

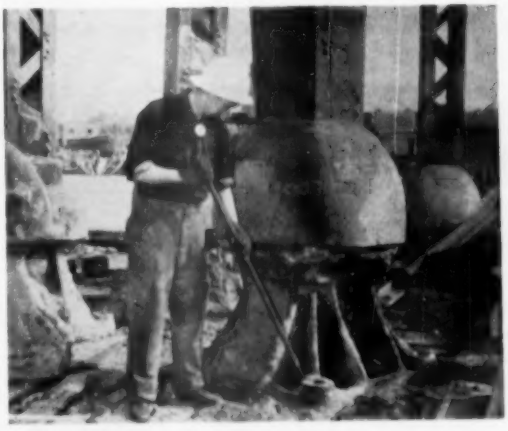
Gas consumption on the job has progressed at an average rate of one tank per man per day. This is due in some part to the fact that pressures are higher than average to cope with the heavy accumulation of paint on the girders. Hose breaks are repaired on the job with brass couplings.

When the job was first begun, tracks, ties, cables and girders were removed as a unit for dismantling in the Lipsett yards. This procedure has been changed until, at present, only minor cutting work is done in the yards.

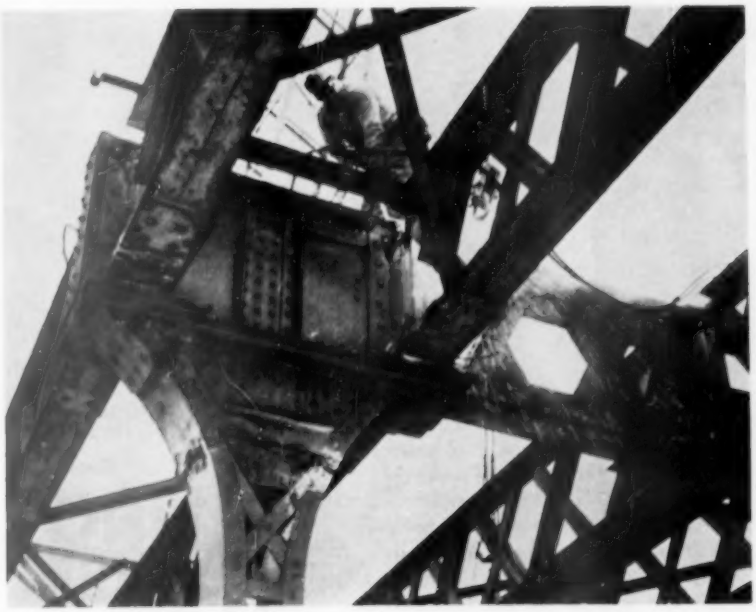
Rails, ties and cables are removed before demolition. Columns and their 2½-ton cast iron bases, which are secured by 4 2-in. bolts to a brick and concrete sub-base, have to be dug and cut out of the pavement before being taken as a unit to the Lipsett yards.

But dismantling this "El" structure is not *all* work. Coins and other objects are continually turned up by torch operators. A recent find was a wallet, lost many years ago, which contained $6.00, a social security card and personal papers. The owner was traced and the wallet returned.

MINOR burning is done at Lipsett yards before scrap is loaded on barges for trip to steel mills.

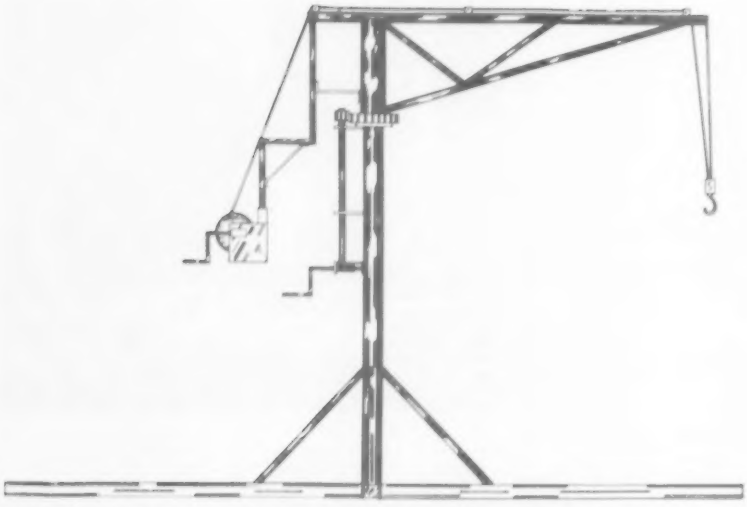


COLUMNS were supported below street on these 2½-ton cast iron bases. Domes are tire bumpers of ⅜-in. cast iron.



TRUCK girder is flame-cut from leader as crane moves into position for hoisting.

STANDARD cylinders were used except where concentrated operations require manifolding.



SKETCH shows author's medium-duty welded shop crane which can be largely fabricated from scrap metal to perform numerous tasks.

All-welded shop crane

BY HOWARD E. BOYLE

A WELDED, medium-duty crane can be ideal for use in shops, garages or foundries, or anywhere a crane of convenient size is necessary. In spite of this crane's small size (9 ft high and about 14 ft wide) it will handle a relatively large load. It also has the advantages of mobility and a 360-deg swing.

Compactness is a convenient factor in shops where storage space is at a premium, and a great number of necessary parts can probably be found in the scrap bin.

The main shaft of the crane is 4-in. pipe, 9 ft long. Legs are 3-in. U-beam or channel iron, 7 ft long. Inboard ends are beveled with a slight arc to fit the shaft. Legs are welded to the shaft in an X-shape at a 90-deg angle.

Both upper and lower sides are welded with a double all-around fillet, and casters are then fitted.

Four side braces of 2-in. pipe, 2 ft 8 in. long, are welded to the main shaft 2 ft from the base, and to the legs at a point about 2 ft from the shaft.

Boom Cap Support

The support for boom cap and ball bearing race is cut from ¼-in. plate with a torch. It is a circle with an outside diameter of 7 in. A 4-in. hole is cut through the center for a snug fit over the pipe shaft.

This support is slipped over the shaft to a point 2 ft from the top. Here it is welded securely with an all-around fillet on the bottom side only.

A rotating worm drive is installed next. Two brackets, 6 in. by 3 in., are made from ⅛ or ¼-in. scrap. A 1-in. hole is bored through one end for the drive shaft.

The worm bracket is a piece of 2-in. strap iron bent to shape. It is tailored to fit the worm, so if a larger worm is used a larger bracket is needed. The handle can be ½-in. round bar stock bent to shape.

Handle Installation

The top axle bracket is welded to the main shaft and the underside of the ball bearing support. The lower bracket is welded to the pipe shaft alone, about 10 in. from the end of the axle.

A 3-in. driving gear is locked into position at the top of the 1-in. axle, and the axle is then dropped through the holes in the brackets. A washer can be tacked to the axle to hold the driving gear at the required height.

The bottom gear for the worm is locked into position and the handle, with the worm attached, is installed in the bracket. This bracket is then welded to the pipe shaft with a double fillet, furnishing rotating drive for the boom and remaining as a unit with the assembly.

Boom assembly is next, and is also made as a separate unit. The boom cap is a piece of 5-in. pipe, 24 in. long, which fits over the 4-in. pipe shaft when completed. A half-circle with a 2-in. radius is cut from the center of the cap at the top. The 2-in. pipe boom will rest in this space.

The center of a 10-in. gear is then flame-cut so that it will fit snugly over the 5-in. cap. It is welded securely with an all-around fillet on the top side only. Care must be taken to insure correct alignment so that the larger gear will mesh with the 3-in. gear on the lower assembly.

The bottom of both cap and gear are identical. Roller bearings are made and installed. These need not be high-speed bearings, but they should be suited for this application.

The 2-in. pipe boom is then placed in the slots previously burned into the cap, allowing 6 ft on one side and 1 ft on the other. If a larger or longer boom is desired, legs must be proportionally longer and stronger.

Hoisting Method

The lower supporting part of the boom is welded to the end of the upper one, and to the cap just above the gear with an all-around fillet. Internal braces are 1-in. pipe and are also welded. The boom, with its 2-in. pipe frame and method of bracing, will hold a surprising load.

At this point, the hoisting method must be determined. The winch arrangement should prove satisfactory since it tends to distribute the strain of the cable load over the whole boom. This equalizes strain, permits occasional oversize loads to be hoisted safely, and increases the boom-load factor with a much larger moment of inertia.

Visit
WELDING ENGINEER
Booth 67
WELDING SHOW
Buffalo, N. Y., May 9-11, '56

WESTINGHOUSE SAVES $18,043 with USS "T-1" STEEL

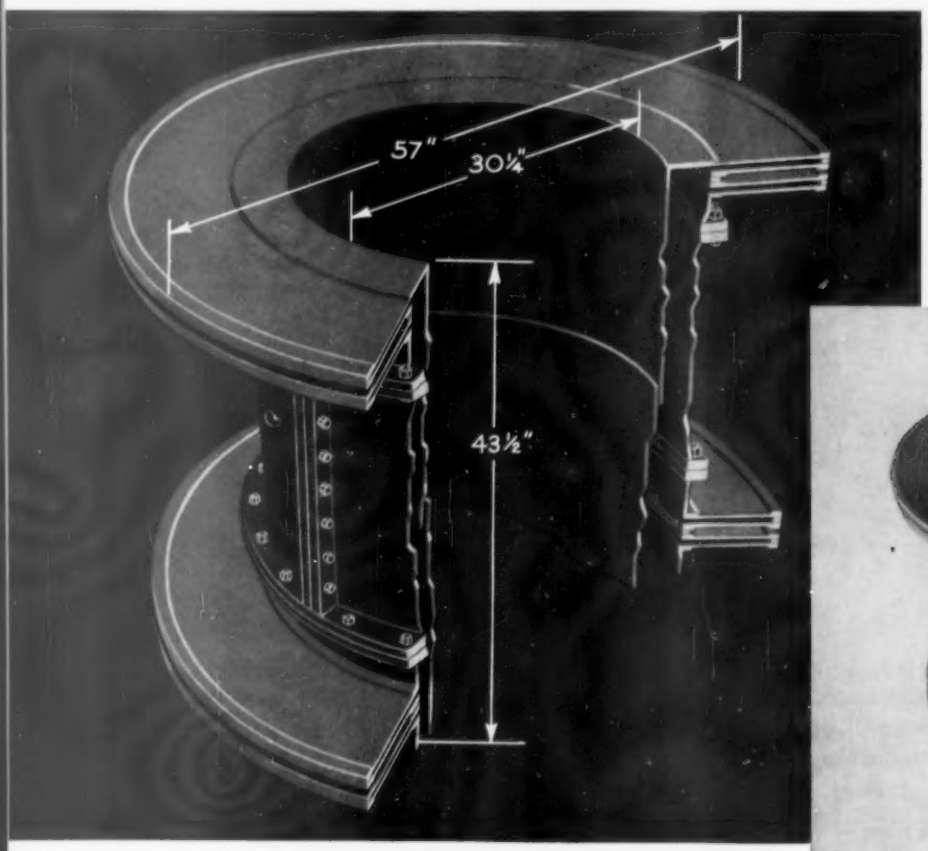
The Sunnyvale, California plant of Westinghouse Electric Corporation controls vibration of huge wind-tunnel air compressors with unusual supporting struts. Steel bellows that flex, both up-and-down and sideways, absorb and isolate the tremendous vibration in these powerful machines. Westinghouse lopped an impressive $18,043 off the cost of these bellows by switching to USS "T-1" Steel.

"T-1" costs less to machine. It costs less to weld. To top it off, "T-1" *costs less to buy* than the steel previously used. Yet it is plenty tough and strong enough to meet the rugged physical requirements.

NEW WAYS TO SAVE MONEY

No other alloy steel can be used in *so many ways* to save money or improve products. Already—and "T-1" is still a relatively new steel—it has been used with great success in rotating machines, earth-moving equipment, towers, pressure vessels, mining machines, printing presses, and other heavy-duty applications.

Think of USS "T-1" when *you* need very high tensile strength (105,000 psi.) and yield strength (90,000 psi.) . . . when you need good creep rupture strength at high temperatures . . . extraordinary toughness at sub-zero temperatures . . . resistance to abrasion, impact, and abuse. All or any of these properties, plus good weldability, are yours in "T-1"! For information write to United States Steel, Room 5184, Pittsburgh 30, Pa.



STEEL BELLOWS SOAK UP VIBRATION. Here is one of the struts that support each air compressor. Two steel bellows—at the top and at the bottom of the central cylindrical section—flex and absorb the shock and stress of heavy vibration from the compressor. Tough, strong, steel was needed for the bellows. USS "T-1" does the job, and saves money for Westinghouse Electric Corporation.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS "T-1" CONSTRUCTIONAL ALLOY STEEL

USS

UNITED STATES STEEL

the first name in resistance welding

THOMSON

In his lifetime, Elihu Thomson amassed the astounding total of 700 patents, many of which profoundly influenced developments in almost every field of industry.

Perhaps his most notable invention is resistance welding. Basic patents were applied for in 1886 shortly before he founded the Thomson Electric Welder Company.

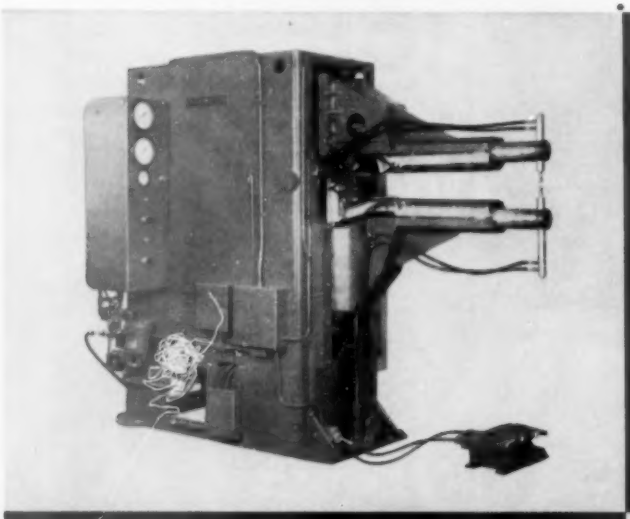
Since then, the Thomson company has continued to pioneer in the development of resistance welding equipment and is largely responsible for making the process the economical and widely applicable production tool it is today. Recent Thomson contributions to the art of resistance welding include:

- Development of high-production standard spot, projection and seam welders.
- "Synchro-Matic" flash welding which opened up entirely new fields of non-ferrous as well as ferrous metal joining.
- Application of automation and precision control to all types of resistance welders.
- Fabric welders, brake shoe welders and other specialized equipment.

Thomson men are strategically located in all metalworking centers. We welcome an opportunity to discuss your resistance welding problems with you.

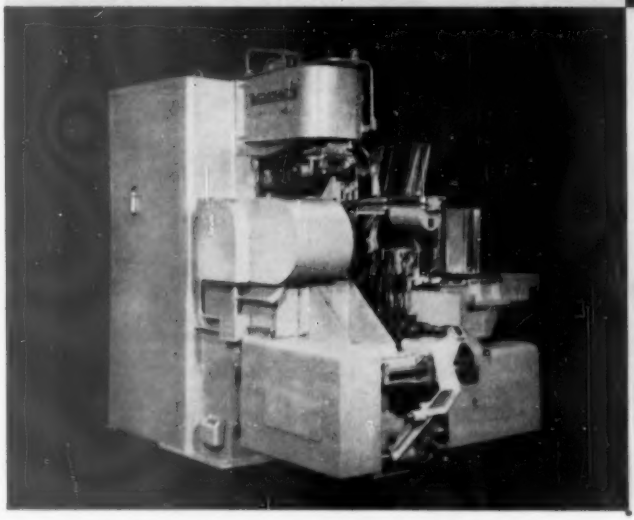
SPOT AND PROJECTION WELDERS

The Thomson line is complete ranging from bench welders to heavy duty presses. The machine shown below is an air operated rocker arm aircraft spot welder.



SEAM WELDERS

Sizes range from 50 to 400 KVA including models for circular or longitudinal seaming or universal machines such as the model shown which handles both types.



SPECIAL PURPOSE WELDERS

Many Thomson special designs have become standard equipment in their fields of application. This is a Thomson brake shoe welder with automatic web feed.

"SYNCHRO-MATIC" FLASH WELDERS

An exclusive Thomson development for flash-butt welding ferrous or non-ferrous metals. The Model F3 Synchro-Matic shown is tooled for miter welding window frames.

FOUNDED IN 1886 BY ELIHU THOMSON

INVENTOR OF RESISTANCE WELDING

THOMSON *Welders*

THOMSON ELECTRIC WELDER COMPANY, LYNN. MASS.

BEGINNING its run, machine welder operates on tracks and joins plates in half the time required for manual welds.

Faster plate welds

BY ALBERT BAVARIA*

WITH a special adaptation of semi-automatic submerged-arc welding equipment, Lehigh Structural Steel Co., Allentown, Pa., has greatly reduced the cost of welding flat plates while obtaining better weld appearance.

The modified machine consists of a standard submerged-arc welder in which the welding cone has been attached to a self-propelled cutting buggy which runs on tracks over large plate sections.

In essence, the semi-automatic machine has been converted to a portable automatic set-up. It has convenient flexibility for structural fabrication, permitting the welder to be taken to the work.

Welding engineer, The Lincoln Electric Co.

AUTOMATIC flame-cutter also runs on tracks and cuts two plates simultaneously.

Coal Hopper Plates

In the particular application shown here, ½-in. plates of A7 mild structural steel are being welded for a power-house coal hopper. Plates are flame-cut with an automatic set-up which simultaneously cuts two parallel plates.

Cut plates are butt-welded with the portable rig without edge preparation. Two passes are used, one on each side.

The first pass is done at a current of 450 amp, while 600 amp is used on the second pass. A travel speed of 20 ipm is used on both passes.

Since penetration is so deep and speed so fast with this system, no edge preparation is necessary and there is little distortion.

Even though total man-hours necessary to do the job is cut to less than half that required in hand welding, weld appearance is greatly improved.

(Clip & Post in Welding Shop)

SOURCES OF GENUINE

ORIGINAL Low Temperature EUTECTIC WELDING ALLOYS

AND EXCLUSIVE EUTECTIC DISTRICT ENGINEER'S SERVICES

ATLANTA, GEORGIA — Cypress 3552

NEW SOUTHERN SERVICE CENTER

Baltimore, Md.	Plaza 2-5022
Birmingham, Ala.	597883
Boston, Mass.	Hubbard 2-2060
Buffalo, N. Y.	Mohawk 8170
Cedar Rapids, Ia.	3-0255
CHICAGO, ILL.	Regent 4-5577

NEW MIDWEST SERVICE CENTER

Cincinnati, Ohio	Main 8404
Cleveland, Ohio	PR. 1-1993
Columbus, Ohio	Capital 8-1664
Dallas, Texas	Ra. 7544
Denver, Colo.	Ke. 5151
Detroit, Mich.	Woodward 3-7245
Evansville, Ind.	5-6992
Flushing, N. Y.	Flushing 8-4000
Gastonia, N. C.	5-3466
Houston, Texas	Fairfax 3-0637
Hutchinson, Kans.	Mo. 5-8581
Indianapolis, Ind.	Market 3326
Kansas City, Mo.	Victor 4248
Little Rock, Ark.	Franklin 5-6909
Los Angeles, Cal.	Atlantic 4-2435 (San Gabriel)
Los Angeles, Cal.	Bradshaw 2-3181, Arizona 7-1234
Louisville, Ky.	Jackson 6673, 8449
Memphis, Tenn.	Ja. 5-1484
Moline, Ill.	E. Moline 3-8070

NEW PLANT & SERVICE CENTER

MONTREAL, QUEBEC — Raymond 1-3339

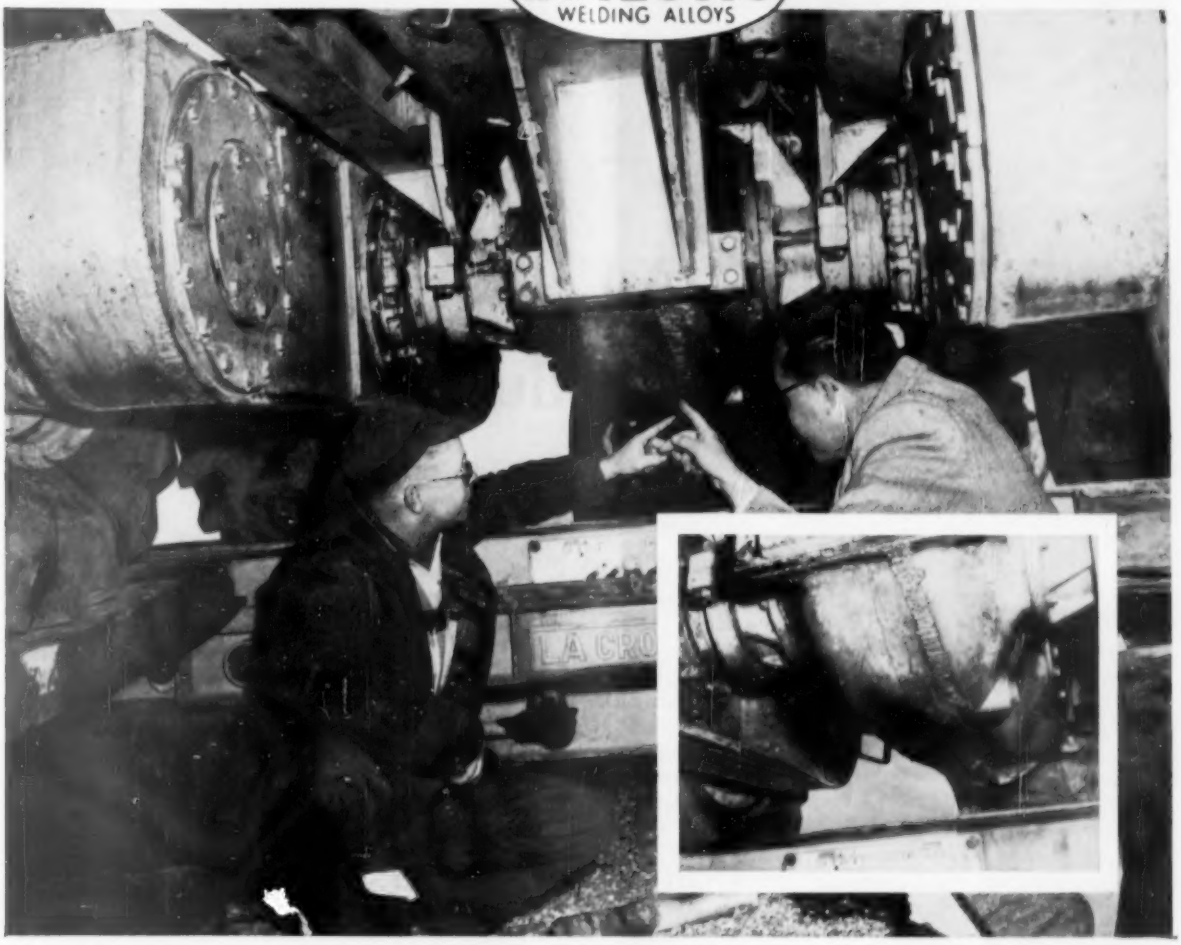
Nashville, Tenn.	4-1671
Newark, N. J.	Market 4-3242
Oakland, Cal.	En. 1-0053
Omaha, Neb.	Walnut 5663
Opelika, Ala.	Sherwood 5-5787
Paducah, Ky.	3-3606
Philadelphia, Pa.	Rittenhouse 6-1818
Pittsburgh, Pa.	Grant 1-9522
Portland, Ore.	Capital 3-6393
Reading, Pa.	Reading 4-3904
St. Louis, Mo.	Taylor 15508 (Kirkwood)
Salt Lake City, Utah	9-8731
San Francisco, Cal.	Douglas 2-7485
Syracuse, N. Y.	Syracuse 54-3595 (Liverpool)
Toronto, Ont.	Empire 8-1343
Tulsa, Okla.	Riverside 2-4783
Van Nuys, Cal.	Dickens 2-9326
Waltham, Mass.	Wal. 5-8172
Washington, D. C.	Sterling 3-3480

Plant, Research Laboratories and World Headquarters

EUTECTIC WELDING ALLOYS CORP.

40-40 172nd St., Flushing 58, N.Y. • Flushing 8-4000

AN EXAMPLE OF ORIGINAL Low Temperature EUTECTIC WELDING ALLOYS AT WORK!



$82.50 "IMPOSSIBLE" WELD SAVES $1,000

When a forty-inch break developed in the rear housing of this Rome Motor Grader — owned and operated by a Roads Commission — it could not be operated. To replace the housing would not only take four months, but involve a cost of over $600 for the housing alone. The labor of dismantling and replacement, and the downtime would bring the actual cost to well over $1,000.

The only alternative was to weld, an operation that some thought impossible. But, in only 8 hours of actual welding time and at a cost of $82.50 including welding, welding alloys, mechanic's time, etc., the housing was repaired so perfectly that, after severe usage, the grader is still in operation. Thus, Eutectic's new Xyron 2-25, the welding alloy specified, helped the Roads Commission save the Government $1,000.

Here's how it was done:

Without dismantling, the entire break was veed to 1/16 of an inch of the bottom of the break with a flexible, portable grinder and a hole drilled at each end of the break. To avoid any possibility of distortion, the break was tacked at the heavy points of the casting. The Shop Foreman welded the break by following the vee with two or three inch passes until the entire area was welded. Each pass was peened and a final pass made over the weld area onto the casting to provide added strength.

The revolutionary non-cracking property of Xyron 2-25 eliminated the possibility of "leakers" and oil seepage. The EutecTrode's remarkable fluidity, wash and unique Xyron 2-25 ease of application made possible time and money-saving position welding.

That's just the way Eutectic Low Temperature Welding Alloys prove themselves, on job after job. Xyron 2-25 is just one of the many new developments in welding alloys created by Eutectic's continuing research program.

Today, with over 160 different, job-engineered "Low Temperature Welding Alloys" to choose from, your Eutectic District Engineer is ready to show you, right in your own shop, how one or more of these "Low Amp" EutecTrodes or "Low Temp" EutecRods will cut your production and maintenance costs. Why not call him today for your free demonstration?

More facts on saving money with Eutectic "Low Temperature Welding Alloys" are contained in the helpful new 32-page booklet "DirectoRod Guide." Ask for TIS 1340 today.

EUTECTIC WELDING ALLOYS CORP.
40-40 172nd Street, Flushing 58, N. Y.

VISIT BOOTH 70 - AWS SHOW - BUFFALO, MAY 9, 10, 11

Dr. George V. Slottman will be honored by IAA as the 1955 winner of the James Turner Morehead Medal. Award will be made at formal dinner.

IAA's 56th meeting scheduled for Los Angeles

MEETING for the 56th year, the International Acetylene Association will begin its annual convention on March 12 at the Hotel Statler, Los Angeles. The meeting will continue through March 14.

A variety of topics will be covered by speakers who will present their papers during the course of the convention's formal business meetings. There will be sessions on transportation, petroleum, education, welding engineering, shop operations and special applications.

Recipient of the Morehead Medal for 1955 will be Dr. George V. Slottman, vice president of Air Reduction Sales Co., New York. IAA's foremost award, the Morehead Medal was established in 1922 by John Motley Morehead to honor his father, the late James Turner Morehead, who in 1892 sponsored experiments which led to the discovery of the electric-furnace method of producing calcium carbide.

"For Aiding the Industry"

The award is presented annually by the Association to the person who, in the judgment of its officers and board of directors, "has done most to advance the acetylene industry or the art of producing or utilizing calcium carbide or its derivatives."

Dr. Slottman will be cited as the 1955 Medalist "for his scientific contributions to carbide, acetylene and oxygen technology." The award will be made as a climax to the Morehead Medal Dinner at 7 p.m. on Tuesday, March 13.

Registration for the convention will begin at 9 a.m. Monday, March 12, in the Ballroom Lounge of the Statler. The oxyacetylene committee will meet one hour later in the Los Angeles Room and, at noon, there will be a luncheon in the Pacific Ballroom at which Norris Poulson, mayor of Los Angeles, will extend greetings to convention visitors.

Presiding at this luncheon will be C. Mc L. Pitts, president of The People's Gas Supply Co., Ltd. of Ottawa, Canada, who has served as acting president of IAA since the death of President J. Carl Bode in November, 1955.

Speaks on Rockets

Dan A. Kimball, president of Aerojet-General Corp., Azusa, Calif., and former Secretary of the Navy, will give the luncheon address: "Where are we going with rockets?"

The first of the technical sessions will get under way early on Monday afternoon, with the presentation of six papers on transportation and petroleum industry topics. An education session will begin at 9:30 a.m. on Tuesday, March 13, and three speakers will present their views on educational opportunities, and industry's responsibilities to education.

Two technical sessions are scheduled for Tuesday afternoon, and three papers will be given at each. These presentations will precede the formal reception and Morehead Medal Dinner on Tuesday evening.

"Training for Welding"

To be presented at the first of these Tuesday afternoon technical sessions are three papers on welding engineering and shop operations. Professor Richard Wiley of California State Polytechnic College, San Luis Obispo, will speak on "Training for welding."

Hans Beike and Dr. Erich Zorn of Knapsack-Griesheim, AG, Frankfort, Germany, will appropriately present a discussion titled "Flame-hardening in Germany." "Flame-cutting of shapes" is the topic of the paper to be presented by M. M. Griffiths, welding engineer, Food Machinery Corp., San Jose, Calif.

Thursday morning's business meeting and "technical know-how exchange" session will conclude the 56th annual IAA convention.

At the "members only" business meeting, a new slate of officers—including a successor to the late President Bode—will be elected. Reports by the secretary, treasurer, consulting engineer and committee chairmen will also be given at the business meeting, and they will be followed by a short address by the new IAA president.

AO F600

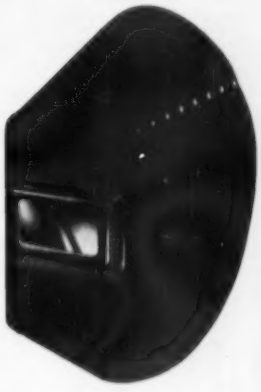
AO F600 and F625 Head-Rest Goggles Are Perfectly Balanced for Welders' Comfort!

Welders detect the advantages of AO engineering immediately in the comfort and positive protection of these head-rest goggles! There's no overhanging weight even when goggle is in "off-guard" position. And protection is fourfold — against harmful light radiations, glare, flying sparks and scale. Designed for wear directly over eyes or spectacles for gas welders, burners, cutters, brazers and furnace operations. The F600 and F625 are identical except latter has large coverglas type cup that will fit over practically all personal prescription glasses as well as Safety I¦ glasses.

AO Drednaut Welding Gloves are Specially Tanned!

Yes, special tanning of selected cowhide makes these gloves a tremendous value. You get the flexibility, strength and heat resistance of cowhide PLUS the longer wear of cowhide! Typical of the Drednaut line is the glove illustrated. It offers exceptional resistance to heat — gives protection on gas welding and the heaviest amperage electric welding. One piece back and palm. Welted at all vulnerable seams for extra protection. Extra heavy lining on back of hand.

Always Popular AO 669 Welding Helmet



Extremely lightweight for comfort. Made from a single fibre sheet, with widely overlapping seams. No outside projections make it easy to work in close quarters. Special type headgear with two positive Stop Joints — one holds helmet in position on face, other keeps it in "off-guard" position. Slide adjustment for perfect fit, No. 1165 Two-Piece Metal Glass Holder for quick insertion or removal of welding plates. Available with standard Noviweld or Filterweld Plates.

YOUR NEAREST AO SAFETY PRODUCTS REPRESENTATIVE CAN SUPPLY YOU. WRITE FOR LITERATURE.

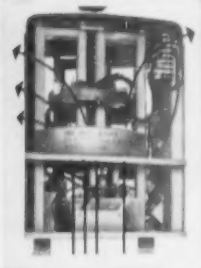
American Optical
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

ANOTHER GENERAL ELECTRIC EXCLUSIVE

Reversible Fan Gives G-E Rectifier

SWITCH DOWN



SWITCH UP

With switch in normal down position, fan draws cool air up through welder. With switch up, air is blown down through rectifier fins to dislodge dust.

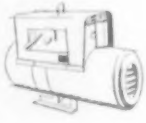
High-speed movies record 30-second cleaning

GENERAL ELECTRIC

FOR ALL YOUR WELDING NEEDS

G-E offers all three types of heavy-duty welders—AC Transformer, DC Rectifier, Motor-generator—plus a complete line of equipment, accessories, and electrodes.

AC Transformer



Motor-generator

Engine Drive

Dusts Off Rectifier in Seconds; Welders Up to 50% Longer Life

Available only with G-E rectifier welders, the 14" combination cleaning-cooling fan gives you up to 50% longer welder life!

Here's why. This double-duty fan ***automatically*** cools the welder, continually drawing cool air from floor level, up through the rectifier stacks, and over the coils. The possibility of recirculating warm air is thus eliminated.

And at the flick of the convenient switch the fan immediately reverses, blowing accumulated dust off the rectifier stacks. This cleaning action helps free the stacks of fibrous dust which frequently blankets the leading edges of rectifier plates, blocking the air flow between the plates and causing burnouts. And because cleaning is so easy, it gets done! Other exclusive G-E features of this new line of rectifier welders include:

(1) FULL-TIME ARC-FORCE CONTROL, which eliminates electrode sticking. This exclusive feature permits the use of shorter arcs, because it blasts away short-circuiting metal droplets which ordinarily would freeze to the electrode.

(2) SILICONE INSULATION on all coils protects the welder from damage due to overheating, fumes, and moisture.

(3) EASILY REMOVABLE SIDE COVERS come off with removal of 3 screws. Simplify routine maintenance; no need to remove primary leads or handles . . . no need to use cranes or hoists. These and other G-E engineered extras (see comparison chart below) are all available only with G-E rectifier welders. Contact your local G-E Welding Distributor for a free demonstration (he's listed in the yellow pages of your phone book); or write for descriptive bulletin GEA-6242, Section 711-4, General Electric Company, Schenectady 5, New York.

	GENERAL ELECTRIC	MANUFACTURER A	MANUFACTURER B	MANUFACTURER C
1. *Full-time* arc-force control	✓			
2. Combination cleaning-cooling fan	✓			
3. Moving-coil design	✓			✓
4. Silicone insulation	✓			
5. Aluminum-wound coils	✓	✓		
6. Removable side covers	✓			
7. Reversing-polarity switch	✓		✓	
8. Large, logarithmic current scale	✓			✓

GENERAL ELECTRIC

DC Rectifier

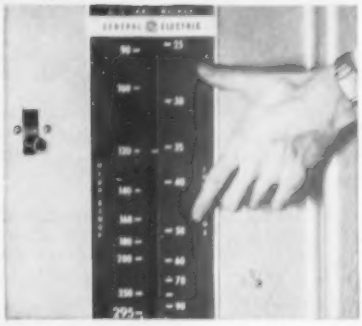
Semi-automatic

Automatic

Electrodes

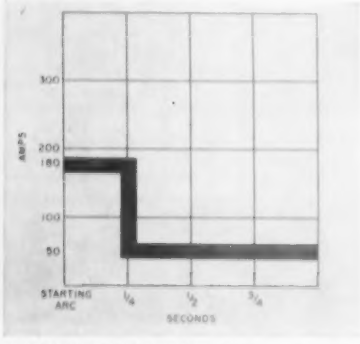
Accessories

WELDING ARCS NEWS

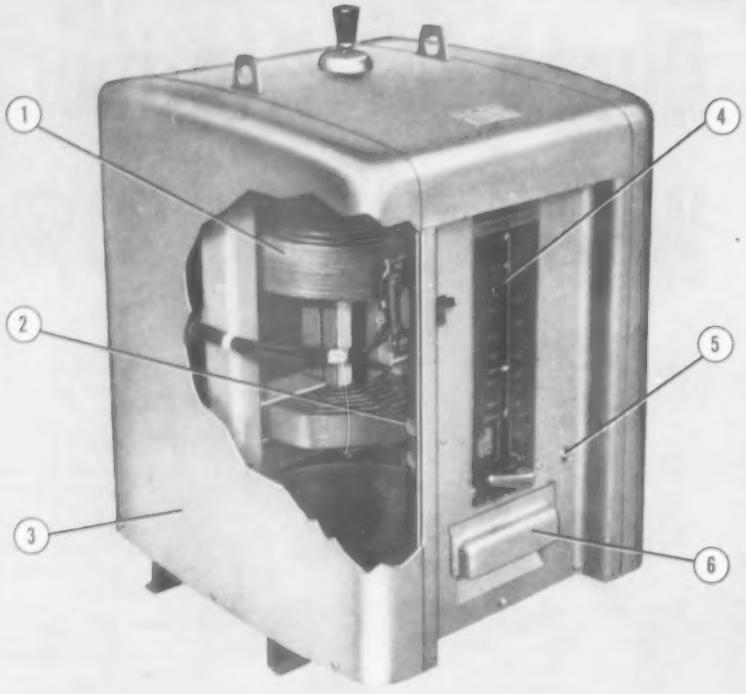


25 TO 295 AMPS are spanned by extra-wide current range, which permits a wide number of varied applications. Low end of the range is expanded for greater accuracy.

SIDE COVERS LIFT OFF easily, with removal of just 3 screws. Maintenance is easy—no handles or primary leads to disconnect, no need to use cranes or hoists.



AUTOMATIC HOT-START gives extra surge of current when electrode touches work, reducing sticking, false starting. Welding is speeded, weld quality improved.



How G-E 295-amp AC Welders Provide Big-welder Benefits At a Small Welder Price

General Electric's 295-amp a-c welder is designed for light-duty, general purpose welding—but offers design features ordinarily found only in more expensive, heavy-duty welders. For example:

1 MOVING-COIL DESIGN provides pinpoint accuracy in current settings and resettings. Settings can be made in an infinite number of steps over a wide current range.

2 ARC STABILIZERS—two arc stabilizing capacitors provide the equivalent of 5 open-circuit volts, to make the normally steady a-c arc even steadier.*

3 REMOVABLE SIDE COVERS come off with removal of just three screws. Routine maintenance and inspection are greatly simplified.

4 WIDE CURRENT RANGE spans 25 to 295 amps. Expanded lower end of range permits extremely accurate settings.

5 AUTOMATIC HOT-START assures instant arc striking by providing an extra surge of current on electrode contact. In addition, hot-start furnishes extra penetration at start of weld, reducing "sticking".*

6 UNIVERSAL BOLT-TYPE TERMINALS located at the base eliminate the nuisance and hazards of dangling leads.

For more information, contact your nearby G-E Welding Distributor (he's listed in the yellow pages of your phone book)—or write Section 712-2, General Electric Company, Schenectady, N. Y. for bulletin GEC-1305.

*Improved arc-performance features, available optionally.

Progress Is Our Most Important Product

GENERAL ELECTRIC

DURING one of the breaks, AWS President Joe Humberstone (left) and Jack Chyle, who will succeed him in June, discuss success of the conference.

300 Attend Midwest Welding Conference

By a Staff Member

WHEN the Midwest Welding Conference was first scheduled last year, there was hope that it would prove to be an annual event. Now, just a few weeks after the second meeting, there is little doubt that it will.

About 300 persons came from all over the nation (and some from Canada) to take part in the conference, which was conducted Feb. 1-2 on the campus of Illinois Institute of Technology, Chicago. Sponsored jointly by the Armour Research Foundation of IIT and the Chicago Section of the American Welding Society, the affair was under the chairmanship of Harry Schwartzbart, supervisor of the ARF welding research section.

Two Resistance Topics

Resistance welding received more attention than ever this year, in response to requests from delegates to the first conference. Henry James, research engineer of Sciaky Brothers, Chicago, spoke on the fundamentals of resistance welding.

Earl B. Morris, Grumman Aircraft Engineering Corp., Long Island, N. Y., presented a paper on the application of this process in aircraft fabrication. "Applications of welding to rocketry," by Francis H. Stevenson, Aerojet-General Corp., Sacramento, Calif., included material on resistance as well as fusion welding.

Another topic asked for was design for welding which was covered by two papers: "Design for structural welding," by LaMotte Grover, Air Reduction Sales Co., New York City, and "Welding of heavy machinery parts," by Norman L. Mochel, Westinghouse Electric Corp., Philadelphia.

Favors Standards

"Standardization can become stagnation, but that doesn't mean there shouldn't be standards," was an opinion expressed by Roger W. Clark, General Electric Co., Schenectady, N. Y., in his talk on non-destructive testing of weldments.

Welding with carbon dioxide as a shield was described by Richard Raney, A. O. Smith Corp., Milwaukee. Donald B. Howard, ACF Industries, Berwick, Pa., presented some new data on artificial aging of welds in his paper, "Iron powder electrodes."

Other speakers were Roy W. Emerson, Pittsburgh Piping and Equipment Co., Pittsburgh, whose topic was welding austenitic stainless for high-temperature service; Harold E. Schultz, General Electric Co., Cincinnati, who presented data on joining heat-resistant alloys, and Arobert A. Noland, Argonne National Laboratory, Lemont, Ill., who discussed welding problems in nuclear reactors.

Such was the success of this recent conference that it has almost outgrown facilities on the IIT campus. A final decision has not been reached, but the next meeting might be held in a downtown Chicago hotel. Also, the dates might be changed so that it will not conflict too closely with the annual AWS spring meeting.

BREAK for "smoke" found AWS Secretary Joe Magrath (right) with his ever-present pipe. With him are O. T. Barnett (left) of Armour Research Foundation and Haldon A. Leedy, director of ARF.

OTHER dignitaries at conference were (from left) AWS Technical Secretary S. A. Greenberg, Second Vice President Clarence P. Sander, and John H. Blankenbuehler, an AWS director in town for a director's meeting.

STEEL is loaded on a welding supply truck before it starts on a regular route. Warehouse is in the background.

VARIOUS kinds of steel stock are shown in this close-up of the bin.

Supplier stocks steel shapes

A highly unusual, but profitable, phase of this welding-supply distributor's business is selling steel.

A WELDING SUPPLY DISTRIBUTOR in St. Cloud, Minn., has found that what may have started out as just a customer service can turn out to be a profitable venture.

Central Welding Supply, Inc., has a small steel warehouse for filling customers' needs. The firm keeps in stock 135 different sizes of angles, channels, strips, flats, squares, sheets and plates. Most of it is hot-rolled steel, but some cold-rolled shapes are also stocked.

The distributor's source of supply is a steel dealer in Minneapolis—about 70 miles distant. The steel is purchased in 5-ton lots in order to gain a more favorable price.

Stock Control System

Central's owners, Leo Rahm and Leo Henkemeyer, have devised a simple filing system for the steel stocks. A card, 4 in. by 6 in., is kept for each piece in the warehouse. The description, size, weight (in 20-ft lengths), and the price paid is listed along with the date and amount of each sale of steel and each shipment received The card also includes the bin number where the steel is stocked.

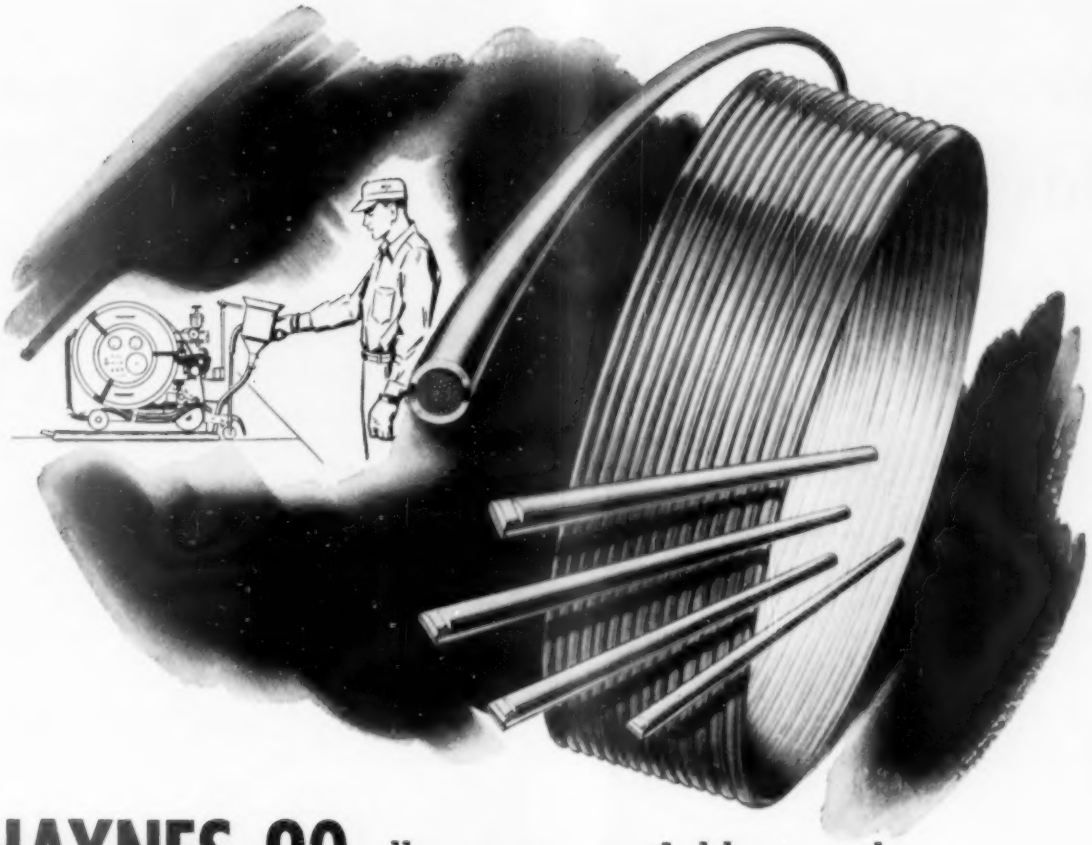
A stock list is mailed to customers every three months. The steel is delivered on regular truck routes, or customers can pick it up at the St. Cloud warehouse.

Firm Less Than 8 Years Old

Central Welding Supply was founded as a Linde Air Products Co. distributor in August, 1948, by Carl B. Shutan, who sold out to the present owners in July, 1955. Rahm had been assistant manager of the firm, and Henkemeyer was serving as office manager.

In addition to Linde products, they handle equipment and supplies manufactured by Lincoln, Stoody and Stulz-Sickles. A non-welding line is Puritan medical gases and equipment.

CHAIN hoist enables flat sheets, including skid-proof plate, to be handled easily.



HAYNES 90 alloy now available in tubes and at a MUCH LOWER PRICE

TRADE-MARK

Now you can save even more by hard-facing wearing-parts with HAYNES 90 alloy. This is because HAYNES 90 costs so much less in this new economical tube form. These new tube rods produce sound, uniform deposits that won't crumble or flake off at temperatures up to 1000°F. They provide the same high abrasion, impact, and corrosion resistance—the same dependable protection for your equipment that HAYNES 90 brought to you as a cast rod—and at a much lower price.

For manual hard-facing, HAYNES 90 tube rod comes in convenient 14-in. lengths for easy application with standard metallic-arc welding equipment. For rapid coating of large parts, HAYNES 90 also comes in coils for mechanized hard-facing by the submerged-arc, inert gas, and open-arc methods.

HAYNES 93, HASCROME, and HAYSTELLITE alloys are also available in this economical tube rod form. HAYNES 93 iron-base rod is noted for high abrasion and corrosion resistance . . . HASCROME iron-base rod for high impact resistance . . . and HAYSTELLITE tungsten carbide rod is tops for resistance to severe abrasion.

For more information about these new, inexpensive tube rods and coils, along with other HAYNES long-wearing hard-facing products, contact your nearest Haynes Stellite Company office today.

"Haynes," "Hascrome," and "Haystellite," are registered trade-marks of Union Carbide and Carbon Corporation.

HAYNES TRADE-MARK ALLOYS

HAYNES STELLITE COMPANY

A Division of Union Carbide and Carbon Corporation

UCC

General Offices and Works, Kokomo, Indiana

Sales Offices

Chicago · Cleveland · Detroit · Houston · Los Angeles · New York · San Francisco · Tulsa

Welded steel tube aids the search for offshore oil

THIS offshore oil drilling platform was welded by Dupont Fabricators, Inc., Morgan City, La. Drilling equipment will be added to the platform.

OFF-SHORE drilling for oil in the Gulf of Mexico is continually being extended into deeper and deeper waters. This difficult task of exploration is made possible by the use of huge drilling platforms of all-welded tubular steel design.

These platforms, now operating in 35 ft of water and more, are self-contained, functional structures that can accommodate a drilling rig, substantial living quarters for the crew and adequate storage space for supplies.

All-welded tubular design gives maximum strength-to-weight ratio and minimum surface area—vitally important factors in offshore structures that must withstand the high winds and choppy seas so common in the Gulf.

Welded Structures

The platforms are fixed in position by pipe piling which is driven through the large-diameter vertical tubing. Protection from corrosion at the water line and splash zone is obtained by using thin nickel-copper alloy jackets to cover the steel tubes.

Construction of a platform begins with the welded fabrication of three 60-ft. sections. Main tubes of the sections are 18 in. in diameter; the bracings are of smaller diameter, as required.

Each main tube is reinforced every 20 ft with a welded steel sleeve. These mild steel sleeves are 5/8 in. thick and 44 in. long.

Welding Procedure

The sleeve welding operation is performed by rolling plate around the pipe, leaving a gap of approximately 1¾ in. between plate edges, then welding this gap with a submerged-arc welder mounted on a specially-built fixture.

Made essentially of two lengthy I-beams, on which rides an easily-movable carriage, the fixture makes it possible to efficiently use semi-automatic, submerged-arc equipment. The welding head is moved by a standard cutting buggy.

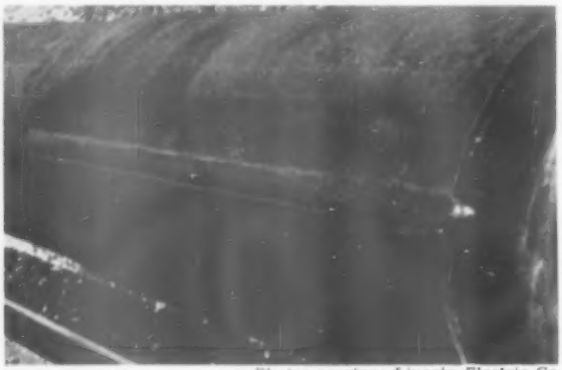
The submerged-arc unit and flux recovery attachment are mounted on the carriage. The 1¾-in. gap is butt welded in three passes using a current of 400 amp with 300 arc volts. A 5/64-in. mild steel wire is used with an agglomerated flux.

When the sleeves are welded longitudinally, the tubes are moved to another location where they are put on turning rolls. Here, circumferential welding is done on each sleeve, again by means of the submerged-arc process.

Finished tubes are taken to the assembly area where they are fitted into the huge platform sections. Cranes are used to position steel and give weldors flexibility of movement for manual operations. All-position welding is done with E6010 electrodes. An entire platform can be completed in about six weeks.

The plan of fabricating drilling platforms on-shore in huge sections—eliminating most of the difficulties of fabrication at sea—is made practical by the use of huge derricks. One seagoing derrick can pick up 150 tons at a distance of 80 ft from the center of rotation and swing it through a full 360 deg. Tied down, the same crane can pick up a load of 250 tons at the same radius.

COMPLETED weld in 1 3/4-in. gap was made in three passes of submerged-arc welder using 5/64-in. mild steel wire.



—Photos courtesy Lincoln Electric Co.

SPECIAL fixture handles submerged-arc welding of mild steel reinforcing plate on main tube for drilling rig.

Its spark is first, then its bite

(Wheel guard removed to reveal grinding action.)

PHOTOGRAPHED AT CUSTOM METAL PRODUCTS CORP., DETROIT, MICH.

The portable grinding of weld beads demands a wheel that can take it. This B7 Bond Resinoid Cup Wheel, for instance, is built to chew through the heaviest welds you'll find. In fact, for all your rough grinding and snagging on castings and forgings, whether steel or non-ferrous, your best bet is a portable wheel by CARBORUNDUM. They're made in both aluminum oxide and silicon carbide, specially bonded to give maximum strength and safety even on severest applications. And they maintain their high initial rate of cut for the life of the wheel...give highest production at lowest abrasive cost. A good man to see is your CARBORUNDUM Distributor or salesman. He'll recommend the best wheel for every portable grinding job in your shop. Call him today, or write The Carborundum Company, Niagara Falls, New York. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ontario.

Through application "know-how" and product quality

CARBORUNDUM

REGISTERED TRADE MARK

continually puts more sense in your abrasive dollar

YES we were 1ST in
1 High impact Tip Insulators to reduce maintenance costs.
2 Interchangeable Tip Insulators to reduce maintenance stock requirements.
3 High heat resistant Plastic Tip Insulators to withstand higher temperatures near welding arc assuring longer life.
4 Plastic Handles to prevent moisture absorption and warpage as well as insulate glove from Holder heat.
5 High conductivity copper for lower tong to carry away inducted heat from rod, as well as high electrical conductivity.
6 Spring Adjustment Screw for ease of Rod release.

AND NOW.... 2 MORE FIRSTS by Wagner HI-AMP ELECTRODE HOLDERS

Visit our Booth 18 at Welding Show, Buffalo, May 9-11, 1956.

7 Wrap around Plastic Tip Insulation for maximum electrical insulation and heat resistance — 30% more than any other make.

8 Brilliant Red and Yellow Plastic Colors insures identification of Holder anywhere in plant — Valuable Safety Feature.

YES, WAGNER HI-AMP LEADS THE FIELD IN ELECTRODE HOLDER IMPROVEMENTS AND ADVANTAGES

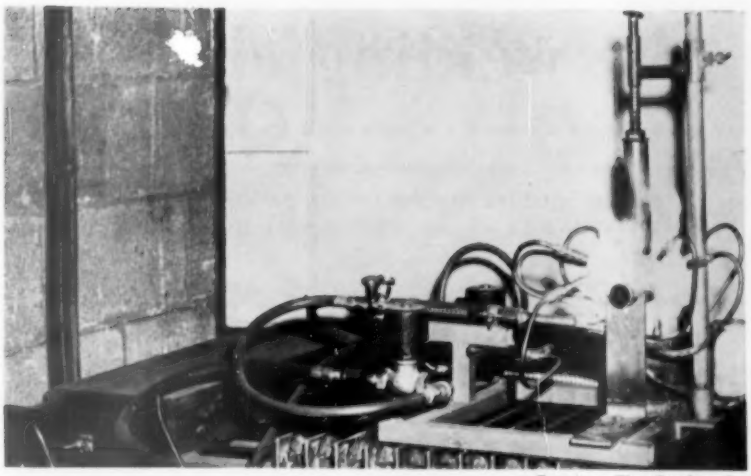
Make your own comparison—using the 8 WAGNER HI-AMP advantages as your guide. You will never use any other Electrode Holder once you actually "see" and "feel" the difference.

Write for Descriptive Literature — Order Today.

Sold only through Welding Supply Distributors throughout the U.S. and Canada.

WAGNER MANUFACTURING CO., *Inc.*, JACKSON, MISSOURI

Weld with Wagner



—Courtesy The Gasflux Co.

WITH steel tubing held firmly in position, six flame-descaling tips do a quick, clean brazing job.

New brazing unit gives stronger tube joints

THE FABRICATION of structural T-joints in steel tubing posed a tough problem for Carl Jacobs, owner of Elyria (Ohio) Welding Service. Notching tubes mechanically, the shop experienced normal fit-up problems and employed a bronze brazing alloy to fill relatively large gaps and insure a strong bond.

Time needed to manually produce a full, uniform fillet, however, was excessive. Devoting a lot of thought and applied research to the situation, Mr. Jacobs and his crew developed a faster, stronger and more economical brazing method.

Major components of the new process are a jig bearing a multiple-tip torch that simultaneously heats the entire joint, and a flux-bearing flame that prevents oxidation, scaling and flux residues. Bronze beads are used for filler metal and a brazing alloy is applied from the inside.

Six-Tip Adapter

While the jig holds the flange and stem members of the joint, brazing heat is supplied by a standard oxy-acetylene torch. An adapter holds six flame-descaling tips on copper tubing leads.

A pilot light is provided for this unit by an auxiliary tube. Both oxygen and acetylene lines have solenoids connected to a control switch.

To insure thorough fluxing, acetylene lines pick up a controlled amount of flux and carry it to the workpiece. In addition, notched ends of vertical tubes are dipped in a boric acid solution before assembly so that inside areas will be properly fluxed.

A ⅛-in. bronze welding rod is run through a cold heading machine to obtain round beads. The number of beads needed for a particular application is predetermined (six ⅛-in. beads are used for a T-joint in 1¼-in., 18-gage tubing) and the corre t number are fed from a piece of tubing onto the heated pipe.

Two Production Units

Capillary actipn eliminates any need for accurate distribution of the bronze beads. The flames are turned off when the brazing alloy begins seeping through to the outside.

Elyria Welding Service uses two units for fastest production speeds. Mounted on grating above tanks of water, one unit is loaded while the other operates. Finished parts are simply dropped into the water.

Other advantages noted in the new process are increased joint strength, a marked absence of porosity, and outside surfaces so clean that no pre-finish grinding is needed.

"I like Airco 78E Electrodes because slag is so easy to remove"

Easy slag removal is just one of the many advantages of Airco 78E electrodes. This deep penetrating, all position electrode produces high quality weld metal which sets up rapidly. It is free from porosity, even when welding in the vertical down position. Especially recommended for welding mild steel where high ductility and tensile strength are essential.

This is but one of many electrodes in Airco's complete line that also includes stainless steel, hard-facing, cast iron, general and special purpose electrodes. Send for the free Airco Electrode Guide which will help you select the right electrode for your specific job. Request catalog 1318-IA.

AIRCO

AIR REDUCTION

New York 17, N. Y.

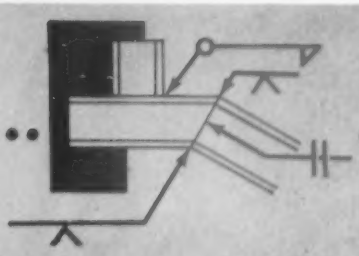
Offices and dealers in most principal cities

On the west coast—
Air Reduction Pacific Company

Internationally—
Airco Company International

In Cuba—
Cuban Air Products Corporation

In Canada—
Air Reduction Canada Limited



the welding clinic

Here you may find the solution to your welding problems, whether they concern design, production, construction or maintenance welding. Submit your questions for answering on this page.

Stored energy for resistance welding

Question:

Why has stored energy become so important as a power source in many resistance welding applications?

Answer:

Briefly, the reasons can be found in decreased power consumption, improved weld quality and higher production.

The development and use of light alloys, particularly in the aircraft industry, can be cited as one important factor creating the need for stored energy power sources. These alloys present low contact and internal resistance. An extremely high current is therefore necessary to obtain sufficient welding heat.

To achieve high heat factor, a correspondingly high kva value is needed to overcome the impedance of a standard secondary circuit. A high, instantaneous demand on the power system, always present when using conventional a-c methods with electronic controls, creates undesirable conditions in three-phase systems.

Interference with other electrical equipment functions and trouble at the central power station are two major problems, and penalties are usually imposed by power companies for this type of load.

The Only Answer

The installation of large and expensive transformers for spot welders was bearable when plants had only one or two machines. But in these days when ten and twenty machines in one plant are common, stored energy is the only possible remedy.

Although surveys have indicated that installation costs of a-c machines and stored energy types are equal, operating costs definitely favor the stored energy types.

Stored energy systems reduce kva demand in a simple manner. The storage system is charged over a relatively long period of time, and is discharged in a very short time. While power is being taken from the supply line over a long storage time, no high and instantaneous demand is created.

A balanced load which gives an inherently high power factor is achieved by interposing a three-phase rectifier between the power supply and the storage system. Also, consistency of welding currents is less affected by line voltage variations in stored energy machines than in a-c machines.

Question:

When spot or seam welding aluminum or magnesium alloys, what is the best way of measuring resistance?

Answer:

For the applications mentioned, there are two methods of measurement favored by many large users of resistance welding machines. One is the static surface resistivity of stock material, and the other is dynamic resistivity of material and surfaces during welding.

Commonly, instruments are used to measure resistance of stock material before welding. Techniques and results are usually similar among those who make these tests, but many equipment variations may be used.

Sheet stock to be measured is held between copper electrodes and a given force is applied. The electrodes may have a radius of, say, 3 or 4 in. A given current of approximately 100 amp is passed through the electrodes from a set of wet-cell storage batteries or an a-c supply.

Voltage drop, usually estimated in millivolts, is measured across the electrodes. This measurement is often taken on an instrument calibrated in microhms (millionths of an ohm).

Equipment Variations

Radius of electrode tips, force on electrodes, type and magnitude of current and type of millivolt-measuring instrument may vary from one user to another.

A minimum unit force usually is required between material and electrode to prevent erratic readings. Sufficient current must also be used to obtain a detectable amplitude of voltage across the electrodes. A vacuum-tube voltmeter, a potentiometer-type millivolt bridge or a double Kelvin bridge may be used to measure millivolts.

The connection of instrument leads to electrodes will be less critical if the measuring instrument has a high input impedance. A vacuum-tube voltmeter will have very high input impedance, for instance, but it also has a d-c amplifier which will drift.

Dynamic resistance during welding is certainly a fundamental welding variable, but it is very difficult to measure. Only in two instances have instruments been made which were capable of measuring it, and these operated successfully only on a long weld time.

One of the devices is a fairly simple moving-element meter which indicates microhms directly as a ratio of voltage over current. The other is a highly complex electronic device which monitors resistance change and modifies welding current accordingly.

gives complete, automatic arc control

IN ANY WELDING POSITION:

...overhead
...vertical
...downhand

an exclusive feature

of the new VICKERS® *Controlarc*

magnetic amplifier-rectifier *DC Welder*

in 200, 300, 400 Ampere Models

- Individual, Stepless, Full Range Control of Voltage and Current
- Full Range Remote Control Available
- Easy, Clean Arc Strikes
- Hot Starts, Immediate Penetration
- Fast Arc Recovery
- No Current Drop-Off During Pass
- Uniform Fusion, Steady Rate of Metal Deposit
- Adaptable to Inert-Arc Applications

WRITE TODAY
for new bulletin

Some Territories open for qualified dealers. Write for details.

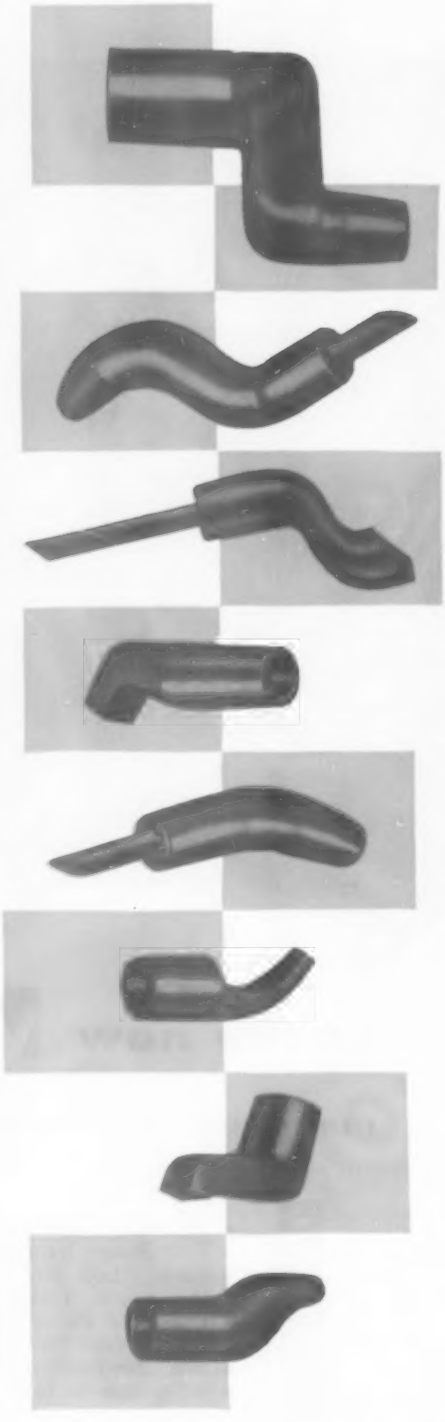
VICKERS ELECTRIC DIVISION

VICKERS Inc. a unit of Sperry Rand Corporation

1851 LOCUST STREET • SAINT LOUIS 3, MISSOURI

Pick Your Special Electrodes

From Hundreds of Existing MALLORY Designs



Need odd-shaped electrodes for resistance welding around corners, inside channels, or other out-of-the-ordinary places?

Before you go to the time and expense of ordering custom-made special electrodes, see what Mallory existing designs can do for your job. We have flexible tooling available for hundreds of different odd-shaped electrodes. What you consider a "special" may well be an existing Mallory type that you can get on prompt delivery . . . and at economical cost.

Included in the Mallory line are cold formed single bend and double bend types. Also, cast and forged offset designs. You have a wide choice of nose shapes, tapers and lengths. Bent electrodes are made by an exclusive Mallory cold-forming technique which develops maximum strength and hardness, to assure long life. Both single and double bend types can be supplied with fluted cooling holes and water tubes bent in place*, to assure highly efficient cooling right up to the welding face. All types use specialized alloys and manufacturing methods which Mallory has developed during thirty years of pioneering and leadership in the resistance welding field.

Stock Mallory straight electrodes, holders, seam welding wheels, dies, forgings and castings are listed in the latest edition of our Resistance Welding Catalog. Write today for this valuable reference book . . . and see your local Mallory welding distributor for prompt delivery of high quality welding supplies.

*Patent No. 2,489,993.

30 Years of Resistance Welding Leadership

In Canada, made and sold by Johnson Matthey and Mallory, Ltd. 110 Industry Street, Toronto 15, Ontario

Serving Industry with These Products:

Electromechanical—Resistors • Switches • Tuning Devices • Vibrators
Electrochemical—Capacitors • Rectifiers • Mercury Batteries
Metallurgical—Contacts • Special Metals and Ceramics • Welding Materials

Expect more . . . Get more from

P. R. MALLORY & CO. Inc.

MALLORY

P. R. MALLORY & CO., Inc., INDIANAPOLIS 6, INDIANA

For information on titanium developments, contact Mallory-Sharon Titanium Corp., Niles, Ohio

NO CLAIMS

TRY A CADDY TEST INSTALLATION TODAY

mail this card today

CADDY ®

ARC WELDING ACCESSORY DIV.

Erico Products, Inc.

2070 E. 61st Place · Cleveland 3, Ohio

IN CANADA: ERICO INCORPORATED, 3571 Dundas St. West, Toronto 9, Ontario

CADDY ARC WELDING ACCESSORY DIV.
ERICO PRODUCTS, INC.

2070 E. 61st. PLACE — CLEVELAND 3, OHIO

☐ I am interested in CADDY TEST INSTALLATION PROGRAM.
☐ Send CADDY CATALOG.

NAME _____ POSITION _____

COMPANY _____

ADDRESS _____

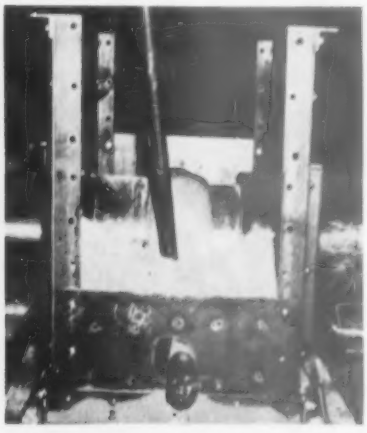
CITY _____ ZONE _____ STATE _____

PREPARATION for thermit welding begins as broken shaft ends are cut parallel with oxyacetylene torch and parts are properly gapped.

Here's why one of welding's oldest processes is still winning many new friends.

Thermit welding sugar mill machinery

BY E. E. CUNTZ*



WAX collar around shaft will melt during preheat and clay-like molding material being rammed into mold box will encase thermit weld.

THERMIT materials are ignited in hopper and reaction occurs. Pour takes only a few seconds.

CRUSHERS, cane mills and other pieces of sugar mill equipment are heavy, expensive machines built to give long and satisfactory service under severe operating conditions. Like other mechanical equipment, however, they are subject to parts breakage due to unusual stresses or sudden shock loads.

Replacement of a damaged section may take months and carry a price tag running into thousands of dollars. In seasonal industries like raw sugar milling, loss of production due to breakdowns when the crop is being brought in from the cane fields is especially costly.

Cane crushing and juice extraction is done at pressures which frequently exceed 400 tons. Mill operators took it for granted that a welded repair would not stand up under such severe service.

Foundry Breaks the Ice

So, for many years, the mill operator accepted irreparable breakdowns as inevitable and took his loss with what grace he could muster.

In 1949, an enterprising Cuban foundry undertook a repair which proved that, in spite of extreme pressures and strains, sugar mill machinery could be repaired quickly, permanently and economically by thermit welding.

Removed from the roll, the broken shaft was aligned and broken ends were cut parallel with an oxyacetylene torch. The gap between the ends served a dual purpose—absorbing expansion during preheating and allowing weld metal to reach the entire surface of the ends.

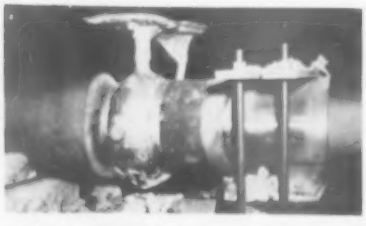
In and around the gap, a collar of wax with vents was formed in the shape of the weld to be made. A mold box constructed around the weld area was rammed with thermit molding material. As the molding material was added, gate and riser patterns were put in position. When the ramming was completed these patterns were removed.

Next, the weld area was preheated through a gate formed for that purpose. Preheating was continued until the parts reached red heat. In the process, the wax collar was burned out as planned, and the mold was dried and readied for pouring.

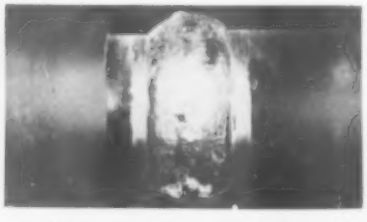
During preheat, the crucible in which the thermit reaction takes place was suspended over the mold and filled with thermit materials. These were ignited with starting powder, and the reaction and pour was completed.

The mold box was removed when slag solidified, but baked molding ma-

*Export Dept., Metal & Thermit Corp.



MOLDING material is broken off, showing weld with pour gates and risers still attached.



FLAME-cuts have removed gates and risers and weld is ready for machining.

Fastest way to save time and money

one CALL to BURDOX

supplies ALL your needs for welding, cutting and safety equipment

EVERY PRODUCT FOR EVERY PROCESS TO DO YOUR JOB BEST

When you make BURDOX your one source for all your welding and cutting equipment and supplies you save time . . . labor . . . money! Since we handle products for all welding and cutting methods we not only recommend the best and most economical for your purpose, but supply your needs completely! You'll find by checking with BURDOX first, you'll do your welding or cutting jobs better . . . faster . . . at lower cost! Catalog on request.

THE BURDETT OXYGEN CO.

3302 Lakeside Ave. • Cleveland 14, Ohio

PLANTS: Cleveland, Dayton, Findlay, Mansfield, Youngstown, Ohio and Los Angeles, California.

BRANCHES: Akron, Cincinnati, Columbus, Ohio.

Progressive now offers YOU welding equipment built to your requirements on a TRUE LEASE basis.

Get that equipment you need now! Let it pay its own way.

- **No capital tie-up.**
- **Small cash outlay.**
- **Finest welding equipment built to YOUR specifications.**
- **Advantageous tax write-off.**
- **No obsolescence problems.**
- **Lease tailored to your situation.**

A sound idea with many advantages for YOU. We will be pleased to give you full details. Write or Phone.

IT PAYS TO WELD

PROGRESSIVE *Welder Sales Company*

915 Oakland Avenue • Pontiac, Michigan

Thermit welding . . .

terial was left intact until the weld had cooled further. When cool, gates and risers were removed and the weld was machined flush with the shaft surface.

Thermit reaction occurs at such high temperatures that ends of fractured parts melt and fuse with weld metal to form a homogeneous section.

The repaired shaft was inserted in a new roll shell and installed in the third mill of a tandem. The roll has operated successfully for six years, grinding well over 2,000 tons of cane per 24-hour day at 400 tons pressure.

The thermit repair reportedly was made at about 50% of the cost of a new roll shaft.

Since the time of this repair, close to two hundred thermit welding jobs have been completed in the cane grinding field. Broken parts restored to service have included crown wheels, axles, pinions, gears, mill housings—and even a locomotive tire from a plantation railway.

Case Histories

Here are the histories of some salvaged parts:

§ A mill in Florida reports two fractured cane mill shafts satisfactorily repaired by thermit welding. Two cane crops have been completed since the repair.

§ In October, 1951, a broken cane mill shaft was welded for a Cuban mill. It has now seen service through four grinding seasons of about 100 days each.

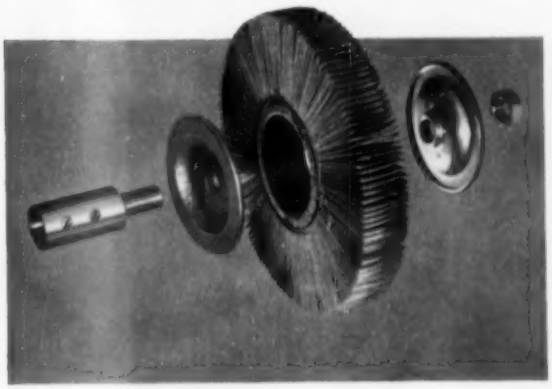
§ Two broken roll shafts from a Cuban mill were thermit welded late in 1953 and put back in service. They have since gone through two crops of 110 days each.

§ Another mill states that the bottom roll shaft on their first crusher was broken through in 1953. After welding and machining it was returned to service and has operated the past two years. *The last sugar crop at this mill was ground at the highest tonnage rate, per hour and per day, in the history of the mill.*

This evidence certainly indicates that thermit welding repairs have stood the test of time and severe service. This old and familiar method has thus expanded its range of application again, and acquired another steady customer—the raw sugar milling industry—on the way.

GRIND-O-FLEX

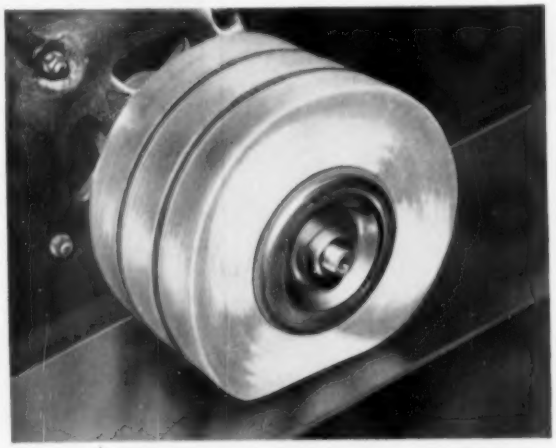
"the FLEXIBLE coated abrasive wheel"



fine grits for
POLISHING
BUFFING
SATIN FINISHING

coarse grits for
DEBURRING
SMOOTHING FLASH
CLEANING & CHAMFERING

Sizes from 6" to 12" Diameters.
Sets up immediately on any light spindle or heavy duty polishing jack.
Smaller sizes are just right for portable use.
Absolute uniformity of finish for entire wheel life.
Requires no skill or experience to produce a perfect finish.



May be mounted in tandem for wider working faces.

For various grits and sizes available see your abrasive dealer, or write—

merit PRODUCTS, INC.
4023 Irving Place, Culver City, California
Manufacturers of SAND-O-FLEX & GRIND-O-FLEX abrasive tools

it's almost magic...

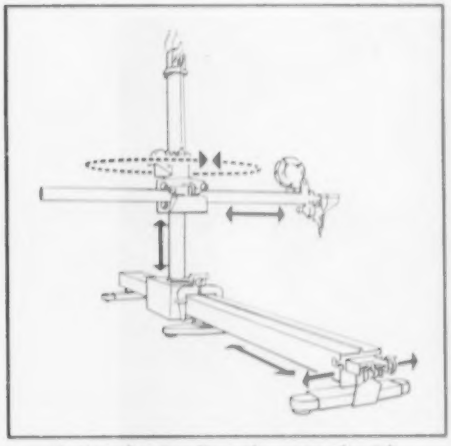
. . . when you can make difficult precision welds with robot-like regularity. But that's exactly what the LEWIS "Universal" can do.

Whether used for volume production or custom jobs, this automatic fixture cuts the time, sweat and high costs normally associated with large weldments.

The "Universal" is portable . . . permits simultaneous 3-directional operation . . . has an adjustable base for quicker positioning of heavy weldments. In addition, any standard head can be installed for welding, flame cutting or hardening. Dual heads can be used to make parallel welds.

For complete details, write today or call BEdford 2-2500. Learn why *it's almost magic* . . .

. . . THE LEWIS "UNIVERSAL" AUTOMATIC WELDING FIXTURE



Designed to handle wide range of weldments, this unit is fully adjustable.

After set-up, welder controls machine with a remote pushbutton console.

LEWIS

THE LEWIS WELDING & ENGINEERING CORP.

77 Interstate Street • Bedford, Ohio

6712-LW

on the job . . .

NUCLEUS of New York City's anti-littering campaign is the waste basket. These welded baskets, made of expanded metal, weigh 51 lb and can withstand rough treatment. An initial order of 2,905 baskets was supplied by Wheeling Corrugating Co. Using a 300-amp d-c machine and E6011 electrodes, weldors made 85 welds in less than 5 minutes, joining reinforcing bands to baskets at every point of contact. Nameplates were spot welded to basket.

ULTRASONIC weld testing was specified by Dominion Bridge Co., Ltd., for steel erection on new $20,000,000 addition for Toronto (Can.) General Hospital. Weldor (above) takes field test which is checked (below) on the job site with portable British-made apparatus. Unit could be carried anywhere on steel work while power source remained on ground. This test method was initiated primarily to maintain quality of butt welds between beams and columns.

—*International Nickel Co., Inc.*

PAPER pulp mill digesters suffered a high corrosion rate until installation of nickel-chromium alloy plate. Weldor here installs top course of cladding plate which amounts to only 10% of the thickness of 1.14-in. digester plate. Clad vessels have shown drastically reduced corrosion rates.

TORCHWELD 54

THE WIDE-RANGE, ALL-PURPOSE WELDING TORCH

This is the torch *par excellence* for all types of work, from 28 gauge sheets to 1" slabs or more. Has easy-adjustment non-seizing valve mechanism for precise control of gas pressure and flow. Mixer blends gas perfectly, delivers to tip without restriction. Both swaged and drilled tips are available to provide required flame characteristics.

Rugged, tough stainless steel tubes . . . silver-brazed at head and base. Lightweight, strong brass handle, grooved to give sure grip and control. Mixer has buna seating rings for leakproof hand-tightening. No metal-to-metal contacts. No scratching or scoring. No costly reseating of torchhead.

TORCHWELD 45

THE LIGHT AND MEDIUM DUTY WELDING TORCH

For automotive welding, pipe welding, sheet metal fabrication, steam-fitting, etc. Aluminum handle, lightweight but rugged. Valve wheels placed conveniently at front end, under the thumb. Mixer delivers perfectly mixed gases. Mixer has buna seating rings for leakproof hand-tightening.

NCG 44

FAMOUS BANTAM® WELDING TORCH

Ideal for welding aluminum, alloys, aircraft tubing, steel from 28 gauge to ⅛" thick. Lightweight, easy to handle, compact for use in tight quarters.

Valve wheels placed conveniently at front end, under operator's thumb. Special nickel alloy tubes, silver-brazed at head and body. Non-seizing, non-scoring stainless steel valve stems. Mixer designed for perfect gas mixing.

TORCHWELD

The All-Star Line of Welding and Cutting Equipment

In this outstanding line of regulators, torches, tips and accessories you will find features galore. Operating features that boost production, handling features your operators go for: cost-cutting features, durability and dependability. All backed by a great manufacturing and engineering organization and a nation-wide network of dealers offering prompt service in every respect. Ask your nearest authorized NCG dealer or NCG office for a demonstration. Or write for a complete catalog.

NCG®

EVERYTHING FOR WELDING

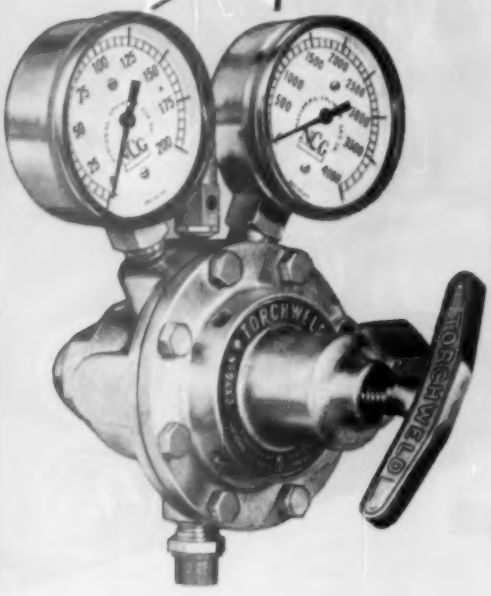
NATIONAL CYLINDER GAS COMPANY

840 NORTH MICHIGAN AVENUE, CHICAGO 11, ILLINOIS

Branches and dealers from coast to coast

Copyright 1956, National Cylinder Gas Company

TORCHWELD 6500 Regulators



TWO STAGE PERFORMANCE AT SINGLE STAGE COST

The best features of both types of regulators—the *dis*advantages of neither . . . that's what you get in the 6500 Series Regulators. That's because of the patented pressure compensating chamber. It maintains desired set pressure *throughout the usable cylinder range!* Yes, here's simple construction, low initial cost, and the precise control of pressures and volumes found elsewhere only in the more expensive two stage regulators.

TORCHWELD 75-1

THE OUTSTANDING CUTTING TORCH

This is the ideal performer for operations of any size or any kind, from small shop to huge mill. Cuts sections up to 16 inches thick.

Pressure-forged, rugged brass valve body; non-seizing stainless steel needle valve stems. Non-warping forged bronze or abuse-resistant nickel alloy heads. Nickel-alloy tubes, set in self-reinforcing triangular formation. Silver-brazed into handle and head. Precision-swaged tip orifices for perfect gas flow and clean, sharp kerfs.

Long control lever, equipped with exclusive *packless* valve. Gives positive smooth control even at lowest rates of flow. Pre-heat gases are blended in tip.

TORCHWELD 36-2

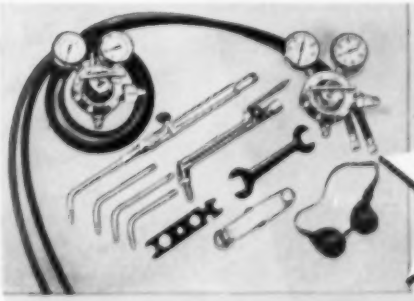
SPECIAL CUTTING TORCH FOR WIDE RANGE OF GASES

A medium pressure pre-mix type cutting torch designed for use with propane, butane, natural gas and city gas as well as acetylene. A fast economical cutter, its capacity ranges up to 16 inch sections.

Top or bottom lever, 75° or 90° forged bronze head. New packless type valve, far outlasts conventional types. Better control and smoother flow of cutting oxygen. Universal type silicon-bronze mixer. Precisely blends preheat gases through entire range of tip sizes. Nickel-alloy tubes, silver-brazed to head and body. Rugged, heavy-duty brass handle, grooved for sure grip and control.

SOD-R-BRAZE® ACETYLENE-AIR TORCH

An efficient, economical soldering, heating and light brazing torch . . . perfect for plumbing, refrigeration, automotive, electrical, maintenance and repair work. Three-way thumb control. Operator turns on and off, adjusts flame and sets pilot light—all with a flip of the thumb. Tips have individual mixers. 6 different sizes for a wide range of work.



TORCHWELD READY-TO-USE OUTFITS

A wide range of ready-to-use complete outfits for every welding and cutting need in every type of shop or plant. All needed accessories are included. Outfits cost less than the total price of components when bought separately.

TORCHWELD CUTTING ATTACHMENTS

Cutting attachments are available to convert each welding torch into an efficient, highly productive cutting torch. Doubles the usefulness of your welding torch.

son Regulators

- Engineered for long, trouble-free service.
- Heavy duty construction.
- Solid forged brass bodies.
- Minimum moving parts.
- Self Aligning Seats (Easily replaced).
- Dependable accuracy.
- Sturdy metal diaphragm. (Works WITH—NOT against pressure).
- Reliable safety valves.
- Shatterproof gauges.
- Top quality for low dollar.
- Models for Acetylene, CO_2, Air, Oxygen, Fuel gas.
- Strictly guaranteed.

There's a Dockson Distributor near you.

Dockson CORPORATION

3839 WABASH AVENUE

DETROIT 8, MICH.

Trade names of silver brazing alloys

No.	Composition, per cent					Melting Range		Recommended brazing temp., deg F	American Platinum Works (S = Silvaloy)	Goldsmith Bros. (GB)	Handy & Harman (E = Easy-Flo)	Unit. Wire & Sup. Co. (S = Sil) (SB = Sil-Bond)	ASTM		Federal Spec QQ-S-561d	Mil. S-15395 Ships	SAE Aero. Mat'l Spec.	No.
	Ag	Cu	Zn	Cd	Other	Solidus deg F	Liquidus deg F						B73-29	B260-52T				
1	85				Mn 15	1760	1778	1800	850	85	85Ag-15Mn	S-85M	2	BAg Mn	(Superseds U. S. Air Force Spec 11342)	(Superseds Navy 47-S-13C)	4776	1
2	80	16	4			1360	1490	1500	A-49	80	IT	S-80	8					2
3	75	22	3			1365	1450	1450	Hard	75	Hard			BAg 11				3
4	75	20	5			1350	1425	1450			#1							4
5	75		25			1310	1325	1325	K-427		Tr #1							5
6	72	28				1435	1435	1450	301	72	BT	SIL-72		BAg-8				6
7	70	20	10			1335	1390	1400	Med.	70	Med.	S-70	7	BAg-10				7
8	65	20	15			1280	1325	1350	Easy	65	Easy	S-65	6	BAg-9	2			8
9	65	28			Mn5, Ni2	1380	1450	1500			RE-MN							9
10	60	25	15			1260	1325	1350	A-33	60	RT	S-60						10
11	60	30			Sn 10	1120	1370	1350	60		RT-SN	S-60T						11
12	60	27			In 13	1125	1370	1300										12
13	56	22	17		Sn 5	1145	1205	1250	S-355	56	ER	S-56T		BAg-7				13
14	54	40	5		Ni 1	1375*	1575	1600	54	54	4772	S-54N					4772A	14
15	50	15.5	16.5	18.0		1160	1175	1175	S-50	50	E 50	SB-50		BAg-1a	4	IV	4770B	15
16	50	15	25	10		1160	1185	1200							6A			16
17	50	34	16			1275	1425	1425	S-25	250	ETX	S-50	5	BAg-6				17
18	50	15.5	15.5	16	Ni 3	1170		1270	503	350	E #3	SB-50N		BAg-3	5	V		18
19	50	28	22			1250	1340	1350	A-28		ET							19
20	45	15	16	24		1125	1145	1150	S-45	45	E 45	SB-45		BAg-1		VII		20
21	45	30	25			1250	1370	1375	A-18	145	DE	S-45	4	BAg-5	1			21
22	45	18	21	16		1140	1190	1180										22
23	41	17	18	24		1125	1190	1160		41								23
24	40	18	15	27		1135	1205	1200										24
25	40	30	28		Ni 2	1240	1435	1490	S-250	240	SS	S-40N		BAg-4				25
26	40	36	24			1250	1400	1400	A-14		DT	S-EEN						26
27	40	30	25		Ni 5	1250	1600	1500	254	540								27
28	35	26	21	18		1125	1295	1300	S-35	35	E 35	SB-35		BAg-2		VIII	4768T	28
29	30	29	21	20		1125	1300	1300		31								29
30	30	38	32			1370	1410	1400	A-13		NT	S-30						30
31	20	45	30	5		1140	1500	1400	S-20	20	ATT	S-20C	3					31
32	20	45	35			1430	1500	1450	A-11		AT Spec.	S-20	2		0	0		32
33	15	80			P 5	1185	1500	1300	S-15	15	Sil-Fos	PHOS. 15		BCuP-5	3	III		33
34	10	52	38			1550	1580	1580	A-4	110			1					34
35	7	85			Sn 8	1225	1805	1550	D-7		SN #7							35
36	6	86.5			P 7.5	1185	1380	1300				PHOS. 6		BCuP-4				36
37	5	58	37			1575	1600	1600			TE Spec.	S-5						37
38	2	91			P 7	1185	1450	1300		1270								38
39	5	88.75			P-6.25	1190	1500	1300	5		Sil-Fos 5			BCuP-3				39

New AMPCO-BRāZ #1
—a "3-in-1" Filler Rod

for

- *silver-like, high-strength joints*
- *low-friction overlays with good bearing qualities*
- *corrosion and wear resistance*

Here's a non-fuming, low-melting-point rod that gives you attractive welds with high strength. Ampco-Brāz #1 has a special "controlled" composition that permits both joining and overlay with the oxy-acetylene process.

A wide variety of copper-base, iron- and nickel-base metals and alloys can be joined with this new copper-alloy filler rod. It produces strong, silver-like welds of 85,000 p.s.i. tensile strength with 160,000 p.s.i. shear strength—in bevelled-butt, fillet, and straight-butt joints. There's no warpage or distortion. Ampco-Brāz #1 is excellent for tough overlays, too, because it resists corrosion and wear.

Ampco-Brāz #1 is ideal for all-position welding, and is easy to apply — uses ordinary brazing fluxes and techniques. It goes on rapidly at low cost because a larger flame can be used without "burning" the alloy. A low bonding temperature and low melting point results in smooth, dense, free-flowing deposits.

Order new Ampco-Brāz #1 from your nearby Ampco distributor or write us for more information.

*Reg. U. S. Pat. Off.

AMPCO
The Metal without an Equal

AMPCO METAL, INC.
Dept. WE-3 • Milwaukee 46, Wisconsin
West Coast Plant • Burbank, California W-130

LETTERS .... *from page 12*

much appreciate another copy of this issue.

E. J. Brady
Alloy Rods Co.

Dear Sir:

. . . May your fine publication have endless "Happy Birthdays" during the coming years.

John H. Headapohl
Hobart Bros.

Braze welding

Dear Sir:

We read the article "Braze welding by the ton" by William Boese, in your January 40th Anniversary issue with a great deal of interest, as well as with curiosity about what means were used to indicate the desired temperature of 500 F when preheating in the improvised furnace.

We are sure the article would be of wide interest and . . . we would like to have your permission to reproduce and distribute it.

Verley Archer
Tempil Corp.

Welded bridges

Dear Sir:

The letter about welded bridges, page 20, your October, 1955 issue, endeavors to create the belief that all steel highway and railway bridges should be designed and built without rivets or bolts in fabrication or erection. This reflects an opinion which I believe has been expressed in your editorials. Such a general policy of design would not be economical in many instances.

There are many construction materials of which steel is only one . . . and no one construction material is best for all structures. A proper design will take into account (1) availability and cost of materials (2) construction costs, reflecting the availability and wages of labor (3) maintenance costs (4) time required for construction.

If structural steel is selected for the frame of the bridge under design, the conditions under which the structure must be erected may make riveting of the field connections the most economical detail. The erection conditions for long span bridges, particularly trusses, are more severe than for buildings.

. . . Currently, nearly every bridge we design, with span length (pier-to-pier distance) less than 160 ft, is of welded fabrication and has all of the field connections welded. This is possi-

*"TUBE-TURN" and "tt" Reg. U.S. Pat. Off.

To help you in the fight on corrosion...

FIBRES of inert iron silicate distributed throughout high-purity iron make wrought iron *tough* and *corrosion-resistant*... hence a desirable piping material for many applications where corrosion is a factor. In this material too, the "TUBE-TURN"* line of welding fittings is *complete* . . . all types, sizes and schedules for every job in wrought iron piping.

Here is another reason it pays to specify this leading brand! You get exactly what you need from more than 4000 items in all piping materials . . . available *promptly* from your nearby Tube Turns' Distributor. He can save you purchasing time and delivery time, and give you more for the dollar with TUBE-TURN Welding Fittings and Flanges.

TUBE-TURN Welding Fittings and Flanges are made in U. S. A.
They meet *all* U. S. piping code specifications.

The complete line... for all your needs

CARBON STEELS
STAINLESS STEEL
CHROME-MOLY STEELS

WROUGHT IRON

ALUMINUM
COPPER
BRASS
MONEL METAL
INCONEL
NICKEL

Available from your nearby TUBE TURNS' Distributor

TUBE TURNS LOUISVILLE 1, KENTUCKY

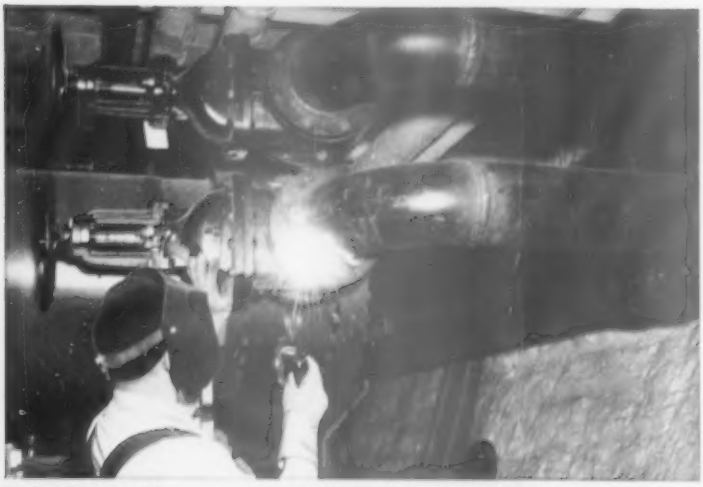
A Division of National Cylinder Gas Company

DISTRICT OFFICES: New York • Philadelphia • Pittsburgh • Cleveland • Detroit • Chicago • Kansas City • Denver
Los Angeles • San Francisco • Seattle • Atlanta • Tulsa • Houston • Dallas • Midland, Texas

APPLICATIONS

TUBE TURNS' *Engineering Service*

helps you apply wrought iron fittings on jobs like these...



Air Conditioning piping . . . wrought iron and TUBE-TURN® Welding Fittings are used for condenser water lines shown here, part of new air conditioning installation at State Capitol Building, Harrisburg, Pennsylvania. Contractors: Riggs Distler & Co., Inc.

Down Spouts on Abbey Avenue Bridge, Cleveland. Made of 10" wrought iron pipe, with 45° TUBE-TURN Wrought Iron Elbows. Contractor: Gorman-Laveile Co., Cleveland.

Hospital piping . . . wrought iron 5" cold water, 2½" high-pressure condensate returns and 4" pump discharge . . . at City Hospital, Cleveland. TUBE-TURN Wrought Iron Fittings used throughout.

Radiant Heating. Many engineers prefer wrought iron piping for these systems (and snow-removal systems). Shown here: welding in bank of coils to hot water line with TUBE-TURN Welding Tee at Capitol Annex Building, Frankfort, Kentucky. Contractor: B. A. Walterman Co., Cincinnati.

All-around Service. Your nearby Tube Turns' distributor will see that your needs in fittings (of all materials, types and sizes) are met promptly. He will also see that you get Tube Turns' engineering service on your piping applications.

WROUGHT IRON FITTINGS AVAILABLE FROM YOUR NEARBY TUBE TURNS' DISTRIBUTOR

90° ELBOWS · 45° ELBOWS · 180° RETURNS · TEES · CAPS

CONCENTRIC REDUCERS · ECCENTRIC REDUCERS · FLANGES

APPLICATION DATA
for use of TUBE-TURN Wrought Iron Welding Fittings...

TUBE TURNS, Dept. N-1
224 East Broadway, Louisville 1, Kentucky
Please send Bulletin TT-787 on Wrought Iron Fittings

Company Name _____
Company Address _____
City _____ *Zone* _____ *State* _____
Your Name _____
Your Position _____

®"TUBE-TURN" and "tt" Reg. U.S. Pat. Off.

TUBE TURNS

A DIVISION OF NATIONAL CYLINDER GAS COMPANY
LOUISVILLE 1, KENTUCKY

DISTRICT OFFICES: New York • Philadelphia • Pittsburgh
Cleveland • Detroit • Chicago • Denver • Los Angeles
San Francisco • Seattle • Atlanta • Tulsa • Houston
Kansas City • Dallas • Midland, Texas

ble because we have developed a deck, stringer-type design, fully continuous and are able to erect with cranes operating from the ground. . . .

On another project, which involves long-plate girder spans, we have permitted the contractor to either weld or bolt the field splices in the girders. The pay quantity of structural metal, in both cases is to be weight of the welded splice. No extra payment is made for the splice plates or bolts if that option is chosen.

We now have under contract a deck truss bridge of continuous design, with pier to pier distances 312-416-312 ft. From roadway level to the ground line, for most of this 1,040-ft-length, the vertical distance is 280 ft. False work of conventional arrangement would be very costly here. All of the field connections in this truss span are to be riveted. I deny that this or the long span plate girders mentioned above will be obsolete before they are built, as the letter states.

Your writer feels that it is difficult to understand why we in the United States are slow to make general use of welding for bridge construction. Part of the answer is this: engineers know that welded construction is not as foolproof as is riveted work. Meager or incompetent supervision of riveted construction of a good design is generally safe. The same character of supervision of welded construction may be unsafe.

There is no place for ignorance or inattention in the supervision of welding where public safety is concerned. There are fabricators and erectors who can not be expected to supply engineering supervision if the customer neglects to do so.

P. V. Pennybacker
Texas Highway Department

—Is riveted work always foolproof? We feel that one of the major difficulties is that people are not as well informed about welding as they are about riveting. When the engineer learns as much about welding as he does about riveting, we imagine many things will change in the construction field.

Welding a tank

Dear Sir:

In the January clinic of WELDING ENGINEER, page 60, you say "...flush the tank with boiling water. Drain and inspect . . . then seal tightly for 15 minutes . . ."

I wish to warn that any vessel sealed air-tight after it has been heated, by whatever means, might be collapsed—crushed—by external atmos-

cost-savings
TOOL FOR TOMORROW
with EASY-FLO and SIL-FOS

Go the "TOOL FOR TOMORROW" theme of this year's ASTE Tool Show one better. Tool for tomorrow with tools that will do your job at lowest cost!

EASY-FLO and SIL-FOS are such tools. These low-temperature silver brazing alloys provide, not only the widest *versatility* in joining metals, but also the basis for surprisingly *simple, fast, economical production.*

A FINE EXAMPLE FROM BLACK & DECKER

Fans for B&D portable drills are made by brazing steel hubs into stamped steel blades on the city gas-air setup shown. Parts are degreased and assembled, with a ring of EASY-FLO 35 dipped in Handy Flux and preplaced between hub and blade. Mechanism moves assemblies along under burners. An assembly is completed every 6 seconds! One operator does it all!

AT THE ASTE TOOL SHOW
CHICAGO • MARCH 19-23
SEE a production brazing job in action . . . EXAMINE the many examples of EASY-FLO and SIL-FOS brazed parts . . . TALK OVER your metal joining problems with our experienced engineers. **BOOTH 275**

GET FULL FACTS IN BULLETIN 20

It explains the many vital advantages of EASY-FLO and SIL-FOS brazed construction — and why these alloys assure fast, low-cost production of high-strength, virtually indestructible joints. Write for a copy today.

HANDY & HARMAN
General Offices: 82 Fulton St., New York 38, N. Y.
DISTRIBUTORS IN PRINCIPAL CITIES

OFFICES and PLANTS
BRIDGEPORT, CONN.
PROVIDENCE, R. I.
CHICAGO, ILL.
CLEVELAND, OHIO
DETROIT, MICH.
LOS ANGELES, CALIF.
TORONTO, CANADA
MONTREAL, CANADA

BERNARD

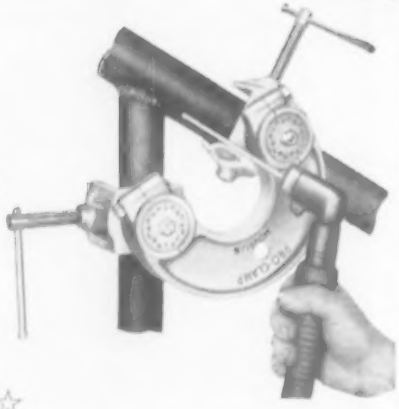
(PIONEER FOR MODERN WELDING)

"Shortstub" ELECTRODE HOLDER

The jaws substitute for stub waste by splicing a 2 inch extension to the length of every electrode.

"Pro-Clamp" MECHANICAL HANDS

MODERNIZE the fabrication of plates, shapes, rods, bars, pipes, etc. MAKE fitting, positioning, holding, and welding a fast, accurate, inexpensive, one-man job.



"Multi-Pic" CONTOUR CLEANER

Delivers FIVE surface cleaning blows with each swing and lasts FIVE times longer than single headed hammers.

HAS 5 CONTOUR FORMING HEADS WHICH MEANS 5 TIMES FASTER CLEANING ACTION.

See Your Local Dealer, or, Write for Bulletins, SS-3, MP-6 and PCB-6

Manufactured By
BERNARD WELDING EQUIPMENT CO.
10232 AVENUE N, CHICAGO 17, ILLINOIS

pheric pressure as it cools off for a partial vacuum is created inside, especially if it has flat walls. Better to leave an air vent to relieve the vacuum.

Andrew Vena
Philadelphia, Pa.

—We don't believe the air would get hot enough from the boiling water.

Welded house

Dear Sir:

The article "Low-cost welded house," in the June, 1955 issue has caused a great deal of interest among my friends and myself. Two of us have drawn a rough draft of a house we plan to build this spring. We would like to know if there is any information available on design and material requirements and how we can obtain it.

R. G. White
Pleasant Hill, Mo.

Dear Sir:

I would like information about the home described in "Low-cost welded house" by John D. Bert, in the June, 1955, WELDING ENGINEER. I would also like to obtain plans, etc.

Albert Buck, Jr.
Elyria, Ohio

Dear Sir:

We are very much interested in the "Low-cost welded house," in your June, 1955 issue. We would like to obtain working prints, places where material can be purchased—all data necessary to construct a welded home.

James Benone
Benone Welding Co.

—For more information about welded home construction, it has been suggested these writers get in touch with John D. Bert, author of the article.

Welding motor blocks

Dear Sir:

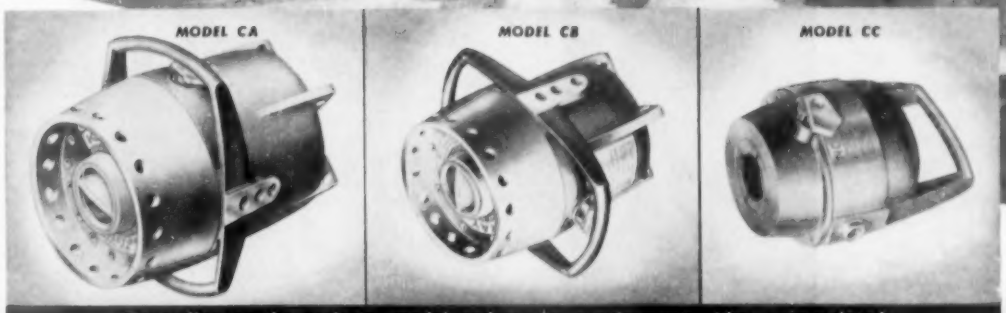
Regarding O. B. Lineau's letter in the January issue about his trouble welding cast iron blocks, I may have a solution. Most weldors do not take trouble to get cracked metal back in place. Using clamps, I have aligned cast that was pushed $\frac{3}{8}$ in. out of place. An air hammer was used to assist the clamps.

When metal is back in place, you usually need only enough weld to hold it there until a good block seal sets in the crack. I have repaired blocks that had 30-in. cracks and now hold antifreeze.

Ivo V. Pennington
Wauneta, Nebr.

presents the KEL-RAY® Projector

A safe versatile tool for Radiography with gamma rays . . .

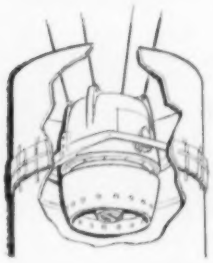


Depending on the projector model and service requirements either encapsulated Cobalt 60, Cesium 137 or Iridium 192 is used as the gamma ray source.

NON-DESTRUCTIVE INSPECTION and TESTING

SAFE

KEL-RAY projectors have extremely low radiation leakage. . . so low they can be shipped and stored without additional shielding. They are tamper, fire, and shock proof. Operated under prescribed procedures, leakage is below the AEC limit.



VERSATILE

A single set-up can produce either spot, doughnut, or hemisphere panoramic radiographs. Thick steel sections can be radiographed; sensitivity is so great even incandescent lamp filaments have been radiographed with a KEL-RAY projector.

CONVENIENT

Designed for field or shop use, the smallest model can be carried by hand—largest is transported and positioned speedily with standard equipment for materials handling and rigging.

ECONOMICAL

Initial and operating costs are low. No delicate parts to pamper or adjust . . . no expensive electrical power source required. Minimized overall set up and exposure time provide further savings.

Each of the three KEL-RAY Projector models is a portable, powerful, shielded, self-contained source of penetrating radiation for non-destructive inspection in maintenance, construction or quality control. There is a KEL-RAY Gamma Ray Projector that can improve your operations —save you time and money! Write for detailed literature.

® Trade Mark of The M. W. Kellogg Company

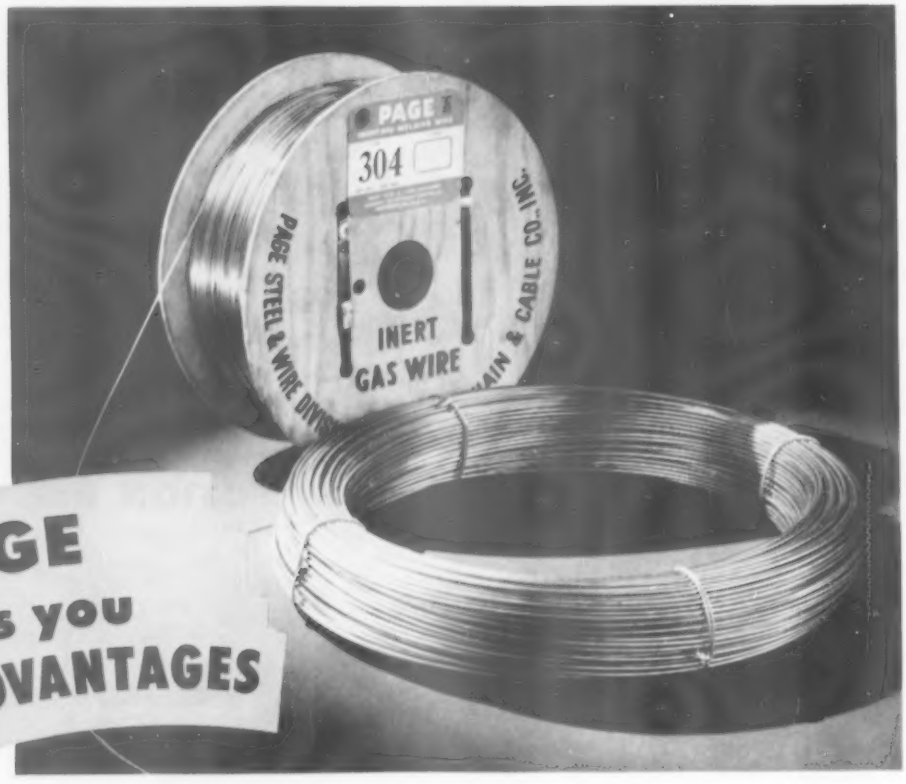
* Sold exclusively by Metal & Thermit Corporation. Designed and manufactured by The M. W. Kellogg Company.

METAL & THERMIT CORPORATION

100 EAST 42nd STREET • NEW YORK 17, N. Y.

ACCO products

Get exactly what you want when you buy PAGE



PAGE gives you 3 BIG ADVANTAGES

Advantage No. 1 — You get the exact analysis you need from the PAGE range of 26 Analyses

• There's no need to compromise on welding wire for that "special" job—for, no matter how different your requirements may be, you can get *exactly* the right wire from PAGE. *There are 26 different analyses in the* PAGE *line.* These cover the field of applications: heavy automatic submerged arc...light manual submerged arc... inert gas manual...automatic, tungsten or metal arc.

CARBON STEEL • **Any carbon from Armco (.025 max.) to high carbon (.90—1.10)**

LOW ALLOYS • **All the most popular welding grades**

STAINLESS • **All standard AISI grades. Other types on request**

PAGE offers a wide range of Gas Welding Rods • Electrodes • Spray Wire

• Your welding job deserves the right electrodes and the right rods—and you can get them from the range offered by PAGE!

Gas Welding Rods • Armco, mild steel, low alloy, 3½% nickel, carbon or stainless steel, manganese or naval bronze.

Bare Electrodes • Any carbon from Armco to high (.90—1.10) carbon.

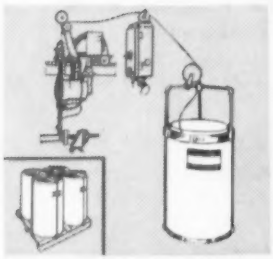
Metal Spray Wire • Any carbon from Armco to 1.00 carbon; also 3½% nickel, manganese or naval bronze, and stainless steel.

—you don't have to compromise Automatic Welding Wire!

Advantage No. 2

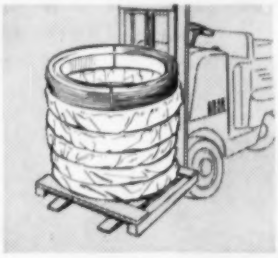
You get Automatic Welding Wire packaged to fit your requirements

• The PAGE Automatic Welding Wire packaging program was developed out of long experience and careful study of users' needs. These fine wires are packaged in a variety of ways for the most complete protection and the utmost convenience in handling and in stocking.



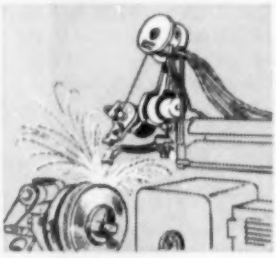
LEVERPAKS and PAY-OFF-PAKS

Lightweight and durable, Leverpaks and Pay-off-paks protectagainstcoildistortion or wire corrosion. Compact, easily opened and resealed, roll and stack easily, take little floor space.



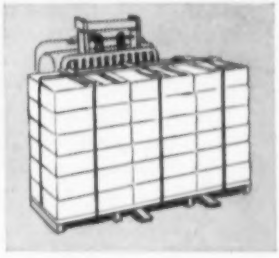
WRAPPED COILS

PAGE also offers single and pallet-mounted (1,000 lb., 2,000 lb. and 3,000 lb.) coils, each coil being wrapped in waterproofed paper and secured by steel strapping.



HANDY REELS

PAGE Inert Gas Welding Wire is available on reels: Precision thread-wound on twenty-five-pound, non-returnable reels to fit all popular inert gas welding machines.



COILS IN CARTONS

One of the most popular of PAGE packages: Coils in individual cardboard cartons, available either singly or palletized for easy handling by fork-lift truck.

Advantage No. 3

You buy from local stocks— and so you need only a minimum inventory

• You can get PAGE automatic welding wire, electrodes or welding rods quickly and easily from your nearby PAGE Distributor—no matter what part of the country you live in.

PAGE Distributors carry ample stocks from which your requirements can be filled without delay or inconvenience to you. This handy service not only saves you time in getting what you need, but makes it unnecessary for you to make a sizeable investment in inventory. Thus, your nearby PAGE Distributor is able to make double savings for you—a saving in time and a saving in actual dollars.

Get the full Analysis List

All the 26 analyses of PAGE Automatic Welding Wire are set forth in complete detail in new Folder **DH-402.** A free copy of this informative folder will be sent on request. Write our Monessen, Pa., office.

ACCO

Page Steel and Wire Division
AMERICAN CHAIN & CABLE

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Bridgeport, Conn.

Better Value

Faster, easier welding of work pieces up to ½ ton with

FREE-HAND ROTATION

of the new P&H Model UP-1000 Welding Positioner

Costs shrink when you install this new P&H Model UP-1000 Positioner. A light touch of the hand rotates the work piece to any position — permitting faster, easier welding. And this easy-to-use P&H Positioner also revolves a full 360° in two planes to provide cost-cutting downhand welding on all types of weldments.

Designed for weldments up to ½ ton, this P&H Positioner maintains static balance in all positions, even when the arm is adjusted up or down to horizontal settings. Because the UP-1000 has a protected friction clutch, you get positive braking of rotation — the weldment is always securely fixed right where you want it.

For greater welding efficiency, safety, and improved quality, use the P&H UP-1000 on all jobs up to 1000 pounds. Send in the coupon for Bulletin P-22.

HARNISCHFEGER
MILWAUKEE 46, WISCONSIN

I'M SMOOTH-ARC SCOTTY...and I'm a hard man with a penny. That's why I recommend our FREE bulletin on the new P&H UP-1000. It tells you how to save time and money. Send for it.

P&H UP-1000 Positioner for all jobs up to 1000 pounds. 26 other P&H Positioner Models to choose from.

P&H

HARNISCHFEGER CORPORATION
Welding Division
4513 W. National Avenue, Milwaukee 46, Wis.
Attention: W. R. Stephens, Sales Manager

Please send me Bulletin P-22 with information on the P&H UP-1000 Positioner.

Name _____ Title _____

Company _____

Company Address _____

City _____ Zone _____ State _____

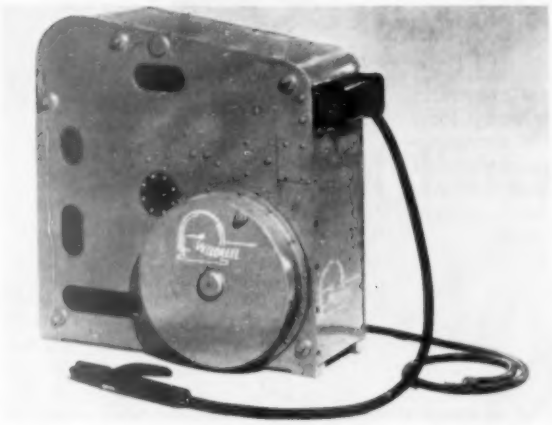
3084

MAIL COUPON *today!*

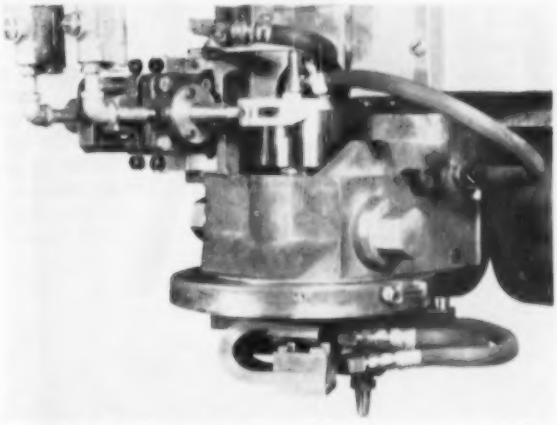
the P&H *Line*

P&H welding equipment is manufactured and sold in Canada by REGENT EQUIPMENT MANUFACTURING COMPANY LTD., 455 King Street West • Toronto, Ontario, Canada

new products . . . . . USE CARD ON PAGE 117



CABLE reel can be mounted in any position and can handle 100 ft of cable.



STITCH welding head can be mounted on press welder; operating speed is up to 100 spots per minute.

Cable reel

WELDING cable reel "EA" can handle up to 100 ft of 2/0 cable at 300 amp. Spring and gear mechanism retracts cable when not in use. Cable may be locked at any desired length by simple locking pawl arrangement. Reel construction permits mounting in any position of floors, walls or ceilings or on mobile equipment. *United Specialty Corp.*

Circle No. 1.

Tungsten electrode

ELECTRODE is for Tig (tungsten inert-gas) welding. New 2% thoriated electrode is claimed superior to 1% type, giving easier arc starting, more stable arc, higher current capacity, longer life, and increased resistance to weld-pool contamination. *Sylvania Electric Products Inc.*

Circle No. 2.

Brazing

NEW development is said to speed brazing operations. New material "Braze Clad" is supplied as a ferrous or non-ferrous metal strip, clad with a predetermined thickness of silver brazing alloy on one or both sides. "Braze Clad" metals are used in two ways: as brazing shim where close control of flow of alloy is necessary; where entire part is stamped and formed from "Braze Clad" metal so that entire surface of one or both sides is completely covered with silver brazing alloy.

Brazing alloy will be automatically preplaced, easing forming of blind joints and joints of large area. Prebonded brazing alloy is anchored to base metal, holding during heating cycle, giving even distribution of brazing alloy throughout joint area. *American Silver Co.*

Circle No. 3.

X-ray inspection

X-RAY unit is for rapid inspection of welds, pipe lines. The "MG 260H" radiography unit fits into trunk of an automobile, is easily portable.

An X-ray tube and high tension generator are completely enclosed in one unit. Maximum high voltage output is 260,000 volts, minimum is 100,000. Unit has fine focus of 1.5 mm. Unit weighs 230 lb and is water-proofed for outdoor use. The "MG 260H" operates from 220-volt a-c power supply; can be adapted for 110- or 440-volt operation. *North American Philips Co., Inc.*

Circle No. 4.

Welding head

STITCH welding head guides spot-welding electrodes in contour seam welding. The stitch head may be mounted on any press welder and replaces upper electrode. Either spaced or overlapping spots on any contour pattern may be used, states manufacturer.

Indexing head is water-cooled for high production. Operating speed is up to 100 spots per minute, dependent on material being welded. Head has 360-deg rotation, maximum radius of pattern is 3 in.; minimum radius is ½ in. Maximum electrode force is 4,000 lb. *The Taylor-Winfield Corp.*

Circle No. 5.

Tip remover

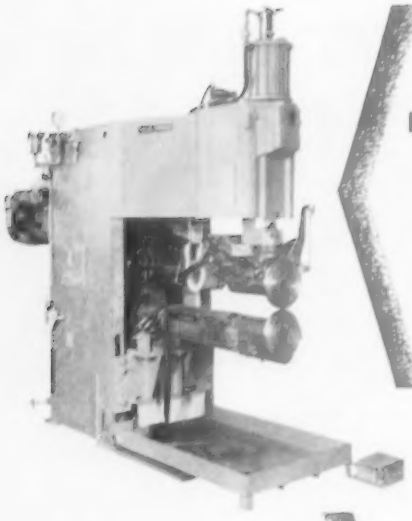
TOOL for removing spot welder tips is called "Ejecto Tip Puller." This device tightens over tip by means of a leverage crank. Easy pressure on the handle then withdraws the tip quickly and without damage to either tip or horn. *Miller Electric Mfg. Co., Inc.*

Circle No. 6.

Brazing flux

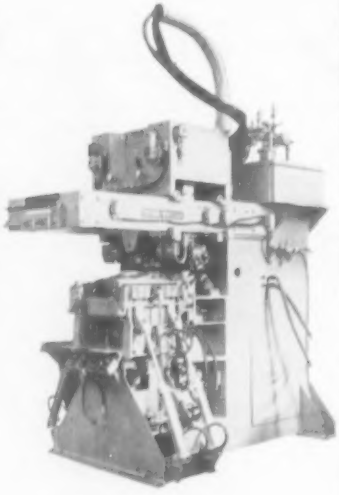
BRAZING flux is for cast iron. When used with either bronze or cast iron rod, "AMCO 4418" is claimed to bring rod to liquid point quickly. Flux also wets metal and permits brazing metal to flow into smallest cavities. Brazing metal amalgamates with base metal to form chemical bond. *American Solder & Flux Co.*

Circle No. 7.



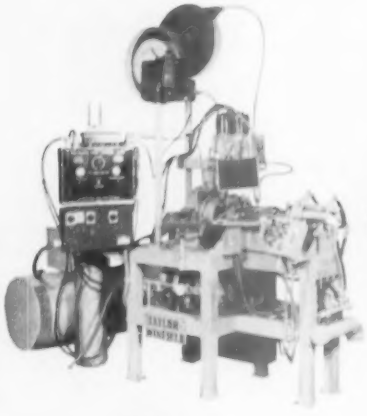
STANDARD
RESISTANCE WELDERS

Efficient, versatile for all basic uses; low operating cost, prompt delivery, long service life. T-W manufactures a complete line of resistance welder equipment—spot, seam, projection and flash-butt.



SPECIAL
RESISTANCE WELDERS

Resistance welders specifically designed for your work—most efficient production, including mechanical features, such as feed, handling, discharge, bending, forming or machining.



SPECIAL
ARC WELDERS

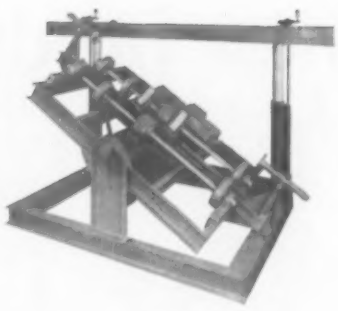
Custom designed for arc-welding assemblies on a production basis. All modern welding methods and equipment are incorporated. T-W are specialists in production line techniques.

The TAYLOR·WINFIELD Corporation
WARREN, OHIO

ELECTRIC RESISTANCE AND ARC WELDING MACHINES

Sales and Service

CHARLOTTE • CHATTANOOGA • CHICAGO • CLEVELAND • DALLAS
DAYTON • DENVER • DETROIT • LOS ANGELES • PHILADELPHIA
PORTLAND, OREGON • SEATTLE • ST. LOUIS • STAMFORD
WASHINGTON • OAKVILLE AND WINDSOR, ONTARIO



Turning roll

TILTING turning roll rotates tanks and cylinders at variable speeds, while they are automatically welded. Unit handles tank diameters of 12-24 in. and 24-72 in. lengths. Weight capacity is 1,000 lb, total weight of vessel.

Rotating speed can be varied, from 6-60 surface ipm, by built-in variable speed drive. Vessels may be tilted, up to 45 deg in either direction, while rotating. Manually adjustable track support permits welding head to be positioned. Jig is recommended for welding small boilers, air receivers and similar types, where one of tank heads is inverted. *The Webb Corp.*

Circle No. 8.

Ultrasonic soldering

UNIT is a hand model designed to solder or coat aluminum, copper, brass, silver or magnesium, by the "Sonobond" ultrasonic fluxless method. Soldering head has a 5/8-in. diameter soldering tip.

Driven by 110-watt generator, head is air-cooled. Unit is versatile, lending itself to all types of work. It can accommodate a variety of soldering tips. Model "S-5-H-55-10" includes soldering head with 70-watt tip heater, generator and 1,200-watt heating platen. *Aeroprojects Inc.*

Circle No. 9.

Face shield

ALL-PURPOSE face shield is for protection in general shop work. "Cesco 770" face shield comes in three window lengths of 4, 6 and 8 in. The windows mount inside an aluminum channel in a tight assembly, claimed to be impervious to dirt or liquid.

Unique feature is flexibility of entire headband. There is no metal or mechanical adjustment to snag the hair. Headband is of vinyl plastic, adjusted by a sliding strap. Windows are of cellulose-acetate—either green or clear. *Chicago Eye Shield Co.*

Circle No. 10.

toughness **TO RESIST SHOCK...**
strength **TO WITHSTAND HEAVY STRESSES...**

International Harvester Company chose ATOM-ARC

7016 ELECTRODES

to produce tough high-strength welds on the Farmall* "Fast-Hitch"...

*Registered Trade Mark International Harvester Company

International Harvester turned to ATOM • ARC 7016 to get welds with the necessary toughness and strength for their McCormick Farmall* "Fast-Hitch".

They discovered that ATOM • ARC 7016 met their requirements for:

1. **x-ray quality welds with outstanding physicals**
2. **faster deposition rate with practically no spatter loss**
3. **smooth, uniform weld bead in all positions**
4. **greater weldor ease of operation**

The detail illustration shows a weldor fabricating the Farmall* "Fast-Hitch" with a positioning fixture and ATOM • ARC 7016 electrodes. Result, easier, faster welds, shorter clean-up time.

Test ATOM • ARC and you'll learn why hundreds of other plants have "*work-proved*" *and standardized* on these iron powder low hydrogen electrodes. To get the complete story, call your Alloy Rods distributor *today* or write:

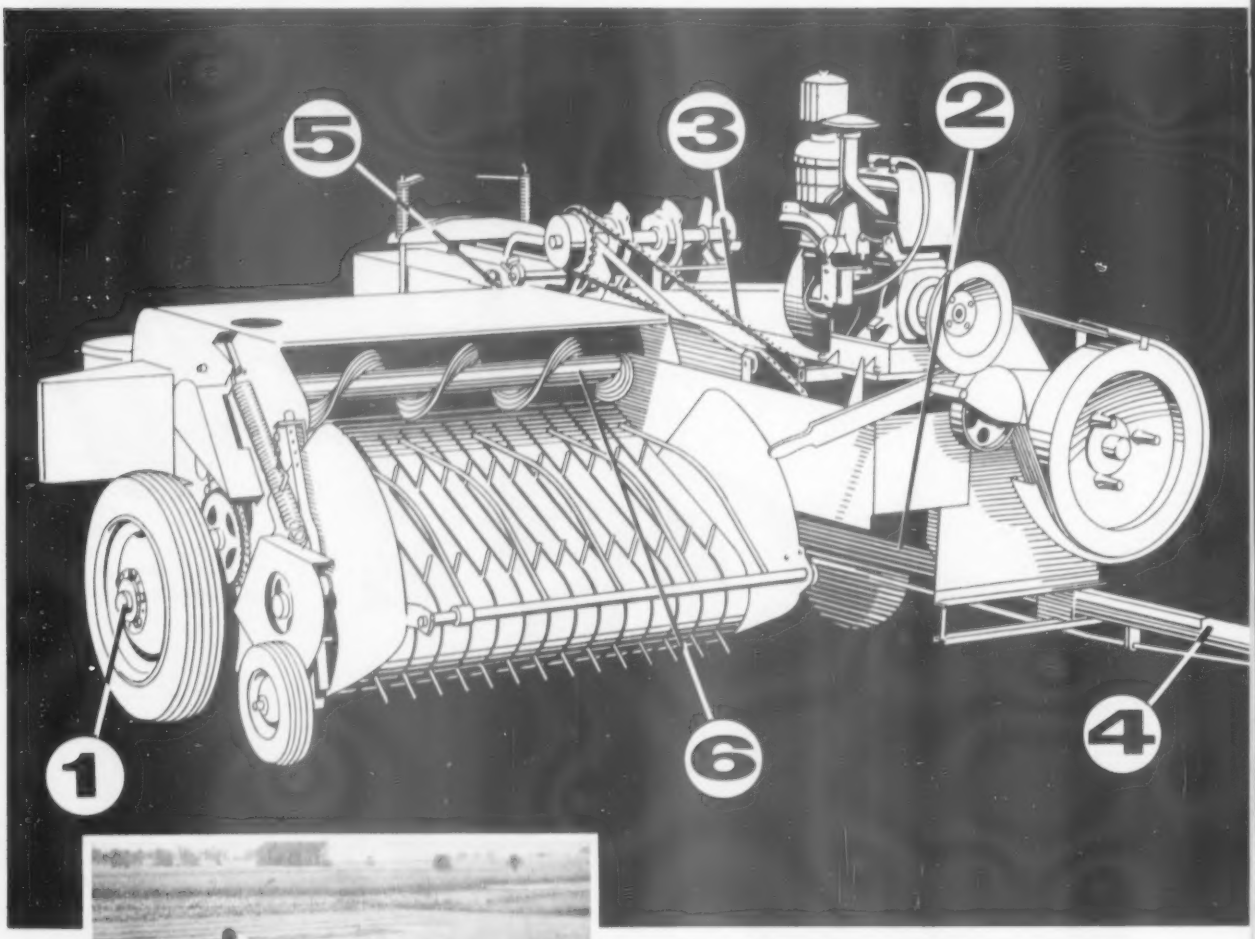
VISIT OUR BOOTH 79
at WELDING SHOW
MEMORIAL AUDITORIUM
Buffalo, N. Y.
May 9-12, '56

Alloy Rods Co.

General Offices and Plant • York 2, Penna.
Pacific Coast Sales Offices and Plant El Segundo, California

no finer electrodes made...anywhere

How New Holland



Where and why New Holland uses SW-44 electrodes

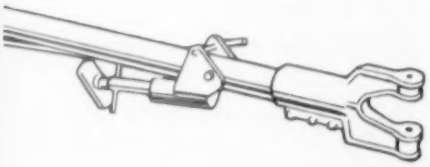
1. **AXLE ASSEMBLY** — Must withstand shocks of fast travel over rough terrain.
2. **MAIN FRAME ASSEMBLY** — Must have rigidity with high impact resistance.
3. **PLUNGER ASSEMBLY** — Must bear up under constant movement at varying loads.
4. **TONGUE ASSEMBLY** — Must have capacity to stand up under great torsional stresses.
5. **NEEDLE YOKE** — Must maintain extreme rigidity for high degree of tying accuracy.
6. **AUGER ASSEMBLY** — Must have stamina to withstand continuous heavy loads.

slashes welding time

with A. O. Smith SW-44 iron powder electrodes

Like hundreds of leading manufacturers who are effecting big production economies, New Holland Machine Co., credits A. O. Smith SW-44 iron powder electrodes with substantial savings. These amazing new electrodes, they say, "deposit much more metal than conventional electrodes – in less time without popouts. Beads are outstanding and self-peeling slag all but eliminates cleaning."

NEW Holland Machine Co., New Holland, Pa., a division of Sperry Corporation, uses A. O. Smith SW-44 (AWS class E-6024) iron powder electrodes in fabrication of their Super 66 Hay Baler.



BOOTH 90
WELDING SHOW
MEMORIAL AUDITORIUM
Buffalo, N.Y., May 9-11, '56

Production experience has shown that SW-44's are far faster to use . . . deposit much more type E-6012 metal than conventional electrodes. They produce smooth, self-cleaning welds with the high degree of strength necessary to stand up under the rigors of high-speed baling.

Whatever your welding costs, consider what substantial savings in welding time would mean in cutting costs in *your* shop. You can't afford to pass up such benefits. Like hundreds of present users (many report welding time cut 25%, electrode cost down 10%), you'll discover A. O. Smith electrode quality is a valuable premium that costs no more.

For complete details on the SW-44 and other economy-making electrodes, contact "your man from A. O. Smith" or write direct.

The man from A. O. Smith . . .

Tom Taylor is the A. O. Smith welding consultant who worked with New Holland. More than a salesman he's a welding specialist, ready and eager to help with any welding problem.

PRODUCED BY WELDERS — FOR WELDERS — Because welding is our full-time business, we offer you America's finest welder-proved electrodes, machines and accessories.

Through research A.O. Smith *. . . a better way*

A.O.Smith
CORPORATION

WELDING PRODUCTS DIVISION
Milwaukee 1, Wisconsin
INTERNATIONAL DIVISION: MILWAUKEE 1, WISCONSIN

GB Silver Brazing Alloys

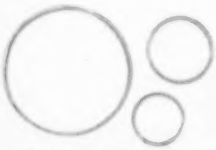
Used In Many Hospitals Where Safety Means Life or Death

Sound, leak-proof joints are a MUST in hospital construction requiring the piping of Oxygen and Anesthetic Gases to wards, rooms and nurseries for *instant use!* That's why leading designers and contractors specify dependable GB Silver Brazing Alloys, Preformed Rings and Fluxes.

GB Preformed Rings, for example, assure stronger, safer everlasting joints. They save time, require less metal, meet all specifications, cost less. Perhaps life or death are not a factor when you do silver brazing, but the dependability, efficiency and economy provided in GB products are good reasons for their choice . . . especially when they cost so little.

. . . Shown above is typical installation of oxygen wall outlet, snap coupler and flow meter. GB Preformed Rings are used to braze (1) wall assembly to screen; (2) tube to regulator; and (3) tube to gauge. For complete data write today.

GB FLUXES are fully active, deep penetrating, stable and economical. Produced under strict laboratory control they are extremely effective in producing high quality joints.



GB PREFORMED SILVER BRAZING RINGS are available in a wide range of sizes for all requirements. They are easy to use, save time and labor, assure lasting results.

GB SILVER BRAZING ALLOYS are made in random coils, strips and many special shapes in addition to preformed rings. Also available is Goldsmith's Technical Service Division cooperation for competent assistance in all brazing problems.

Dealer Distributor Inquiries Invited **Write for GB Data Book**

GB Goldsmith Bros. SMELTING & REFINING CO. Est. 1867

1300 W. 39th Street • Chicago 36, Ill. — NEW YORK • DETROIT • OAKLAND

Mail Coupon for your FREE copy of the GB Data Book — complete information on low temperature Silver Brazing

PLEASE SEND GB Data Book without obligation.

Name_____

Address_____ City_____ State_____

Flux pot

UNIT is designed to warm and maintain brazing and soldering flux at a constant temperature. "Helmco-Lacy" flux pot prevents underheating with inefficient too-thick flux. Also prevents overheating and dry-out, evaporation and out-of-emulsion flux, states manufacturer.

Flux pot is available in five- and ten-lb size. Exterior is of easy-to-clean aluminum. Highly-glazed vitreous enamel bowls are said to prevent contamination of flux. Heating elements are insulated; dial thermostat allows temperature adjustment. The 10-lb unit operates on 110-120 volt, a-c, 350 watt; 5-lb unit operates on 110-120 volt, 175 watt. *Helmco, Inc.*

Circle No. 11.

Arc welder

Two series of a-c/d-c arc welders are for inert-gas and arc welding. The "SRAC" series is designed for metal-arc welding, available in 200, 300 and 400 amp, with or without power factor correction.

The "SRTA" series is primarily for inert-gas and inert-gas spot welding. Welders are available in 200 or 300 amp; all are power factor corrected. Both series operate from single-phase power line. Current can be controlled remotely at the welding position. *Miller Electric Mfg. Co., Inc.*

Circle No. 12.

All-purpose hose

SUITABLE for use with air, oil, water and mild chemicals, "Allflex" all-purpose hose is claimed to have long life and to be non-kinking. It is of mandrel-made, horizontal-braided construction. *Raybestos-Manhattan.*

Circle No. 13.

For more information use card on page 117

Weldor examines 4,200-lb. dredge pump casing repaired quickly and easily with Ni-Rod "55" electrodes.

Finish grinding of welds. Small upper patch is another crack previously repaired with Ni-Rod "55".

How $20 worth of Ni-Rod "55" electrodes saved a $1,500 cast iron casing

You're looking at part of an "underwater vacuum cleaner."

It's the 4,200-lb. cast iron casing for a dredge pump. And sand, gravel and rocks were this pump's regular diet. Until one day a rock tore a big hole through the two-inch thick casing.

At first, the owners were ready to scrap it. Then they decided to try repairing the $1,500 casting by welding with Ni-Rod "55"* electrodes.

First, their weldor cut grooves in a steel plate and formed it to fit over the hole. Next, he heated the area around the break, and welded with 3/32-inch diameter Ni-Rod "55" electrodes.

The outside took four passes. The inside, two more, with a smaller plate for fill-in. Finally, the weldor hard-surfaced the inside.

The entire job took 6 hours and 10 lbs. of Ni-Rod "55" electrodes. About $20 worth!

Ni-Rod "55" electrodes give big advantages

Repairs like this one prove it's easy to weld cast iron with Ni-Rod "55" electrodes. *Easy* to make field repairs. *Easy* to do production welding.

Use A.C. or D.C. *Easy*-handling Ni-Rod "55" electrodes give you stable arc. Smooth bead contour. *Easy* slag removal. And they give you sound, machinable welds. Order a 5-lb. trial package today.

*Registered trademark

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.

Get handy new guide on cast iron welding

Do you want to know more about how to weld cast irons? Then send for "A Handy Guide to Welding Cast Iron with Ni-Rod* and Ni-Rod "55"*". It's fully illustrated — contains helpful case histories. Gives many handy tips on preparation, welding technique, getting maximum machinability, production welding, welding heavy sections, salvaging castings, and joining cast iron to other ferrous metals. A copy of this useful booklet is yours for the asking.

INCO TRADE MARK

Welding Products

Electrodes
Wires
Fluxes

Hey Boss! THIS is one we all like!

Get 5 to 20 percent more fillet footage per electrode. You can with new Westinghouse SW-3, E-6013 electrode. It's especially outstanding for skip and tack welding in all positions. You'll be amazed at its fast metal spread and slag balance, its easy manipulation on poor fit-ups. No burning through. No undercutting.

Yes, it's true. But we feel the best way for you to find out is to try this new electrode in your shop under your conditions. That's the only fair test. To prove it to yourself, send in attached coupon today.

J-21922

Only Westinghouse offers this welding leadership!

YOU CAN BE SURE...IF IT'S

Westinghouse

WESTINGHOUSE ELECTRIC CORPORATION

Welding Dept., P. O. Box 868

Pittsburgh 30, Pennsylvania

☐ Send full information, samples, new Westinghouse SW-3 Electrode

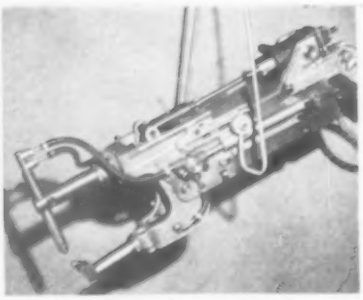
☐ Have welding specialist call

Name_____

Address_____

City_____

State_____



Spot welder

GUN for spot welding is air-hydraulically operated. Termed "P 413," gun is for gages up to II+II. Air-hydraulic system is said to ensure high pressure and enable operator to achieve high production without fatigue. Gives consistent high-quality spot welds, states manufacturer. *Aro Spot Welders, Inc.*

Circle No. 14.

Head manipulator

WELDING head manipulator is automatic. Featuring twin tube mast and ram for rigidity, manipulator can be had in numerous sizes and models—self-propelled and stationary types.

Manipulator is readily adaptable to all types of welding, states manufacturer. Offering three-directional travel, unit has power-operated vertical travel, variable speed ram movement and carriage drive, with 360-deg mast rotation, manually or motor-operated. *Worthington Corp.*

Circle No. 15.

Induction heater

FLEXIBILITY is said to be feature of "Model 5000" induction heater. It is adapted for high-temperature (1,900 F) brazing; can rapidly braze, solder or harden.

Special features are boxed, shielded control panel; dry-type automatically tuned output transformer; air-cooled tube; heavy steel cabinet; aluminum parts; replaceable fiber glass filters on forced air cooling system. *Radio Frequency Co.*

Circle No. 16.

Electrode

ELECTRODE is for welding carbon-moly steel. An iron-powder low-hydrogen electrode, "Atom Arc 7016" is claimed to deposit a weld metal containing 0.50% molybdenum. Electrode has tensile strength of 79,000 psi, with an elongation of 31%, 2-in. scale. *Alloy Rods Co.*

Circle No. 17.

Acetylene Cylinders...

FILLED WITH APOTHECARY PRECISION

Filling a Norris-Thermador Acetylene Cylinder with charcoal monolithic filler for outstanding welding performance is as exacting as filling a medical prescription. Ingredients must meet rigid Norris-Thermador standards and are compounded with apothecary precision. For example, we go to the State of Washington for the particular fir used to make charcoal of a prescribed texture. Other woods do not provide the qualities necessary. Proper combination of the charcoal with three other filler components—diatomaceous earth, asbestos, and cement—produces a monolithic filler with high porosity and permeability. As a result, Norris-Thermador Acetylene Cylinders take more gas faster and fill more uniformly.

Undeviating accuracy at every step assures utmost value and serviceability for every cylinder user.

EXTRA FEATURES Cold-drawn construction... lightweight for easy handling... bases curled *under* for maximum strength and compact storage... larger cap holes... tags easily read without having to remove them... all welding X-ray controlled... specifications ICC-8 met and exceeded.

Acetylene Cylinders from 10 to 300 cubic feet capacity

Write or wire for specifications on all sizes. Cable Northerm.

NORRIS-THERMADOR CORPORATION

5215 SOUTH BOYLE AVENUE, LOS ANGELES 58, CALIFORNIA, DEPT. WE-356

SIL-BOND
PHOSON

United's Brazing Alloys

Easy To Use

Super Strength

Meets

All Specifications

For mass production, or single purpose jobs . . . you're right every time when you braze with United's Phoson or Sil-Bond and low-temperature Sil-Flux. A brief glance at the chart below will show you how United's brazing alloys and Sil-Flux conform to all standard specifications, and are so certified!

See Standard Specs These Alloys Meet!

Name	MILITARY S-15395 (was Navy 47-S-13a)	FEDERAL QQS-561-d Army Chem. Warfare 196-131-80	Aero Mat's Spec.	ASTM B260-52T & AWS A5-8-52T	U. S. Army 57-97-1A	% Silver	Solidus °F	Liquidus °F
Sil-Bond 50	IV	4	47708	—	—	50	1160	1175
Sil-Bond 50N	V	5	—	BAg-3	—	50	1195	1270
Sil-Bond 45	VII	—	—	BAg-1	7	45	1125	1145
Sil-Bond 35	VIII	—	—	BAg-2	8	35	1125	1295
Sil-40N	—	—	—	BAg-4	—	40	1220	1435
Sil-45	1	1	—	BAg-5	—	45	1250	1370
Sil-50	—	—	—	BAg-6	—	50	1275	1425
Sil-56T	—	—	—	BAg-7	—	56	1145	1205
Sil-72	—	—	—	BAg-8	—	72	1435	1435
Sil-65	11	2	—	BAg-9	—	65	1280	1325
Sil-70	—	—	—	BAg-10	—	70	1335	1390
Sil-85M	—	—	4766	BAgMn	—	85	1745	1760
Sil-54N	—	—	4772	—	—	54	1325	1275
Sil-20	—	—	—	—	—	20	1430	1500
Sil-20C	0	0	—	—	—	20	1140	1500
Sil-9	—	—	—	—	—	9	1510	1575
Phoson-15	111	111	—	BCuP5	—	15	1185	1500
Phoson-6	—	—	—	BCuP4	—	6	1185	1480
Phoson-0	MIL-C-20158 (was 47C3)	—	—	BCuP2	—	0	1305	1485
Sil Flux	51F4A	Air Force MIL-F-4483	AMS 3410	—	4-1121	—	FLUID 1100°F-1600°F	

Quality-control production from alloying to finished forms of wire, rod, ring strip and powder

Free! fully-illustrated catalogs and price sheets.

BOOTH 23

WELDING SHOW

MEMORIAL AUDITORIUM

BUFFALO, N. Y. • MAY 9-11, 1956

Permanently United

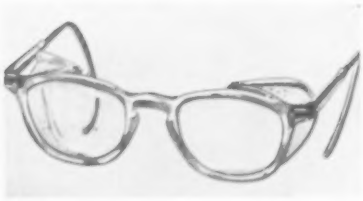
UNITED WIRE

AND SUPPLY CORP.

Brazing Alloy Division

PROVIDENCE 7, R. I. — OFFICES IN PRINCIPAL CITIES

LOOK TO UNITED FOR THE BEST IN ALUMINUM, COPPER AND BRASS TUBE AND WIRE.



Safety goggles

WIDE scope design of "Vivid View" safety goggles offers wider viewing area while giving eye protection. Goggles are light, giving greater comfort, it is claimed.

Goggles have removable side shields, adjustable end piece, newly designed nose bridge for better holding. Two series are available: "F500" made of metal; "F950" made of acetate. *Pulmosan Safety Equipment Corp.*

Circle No. 18.

E7016 electrode

WELDING electrode, E7016 classification, is low-hydrogen, iron-powder type. Electrode combines characteristics of low hydrogen type with deposition rate of iron powder grade.

Termed "716-IP," electrode can be used with reverse polarity, d-c or a-c, at amperage higher than usual for this type. Weld metal is claimed to have 81,000 psi tensile strength and 69,000 psi yield strength. Available in 40 and 50-lb metal containers. *The McKay Co.*

Circle No. 19.

Foot switch

IDEAL for operation of spot welders, foot switch is made of aluminum. Model "FF 15AM" features floor mounts so that it can be made permanent. Aluminum ribbed top, a nonskid feature, stands up under wear, states manufacturer.

Contact rating is 15 amp, 125 volt, a-c single pole, double throw. Switch is also available in double pole, double throw (10 amp). Overall size is 6 in. long, 4 in. wide, 1¾ in. high. It is available with or without 6-ft cord and series plug. *Vemaline Products Co.*

Circle No. 20.

Grinding wheel

PASTEL yellow vitrified grinding wheel is said to be a cooler cutting and more efficient tool. Wheel is claimed to provide sharp contrast, enabling wheel operators to see work better. *Electro Refractories & Abrasives Corp.*

Circle No. 21.

The Harbormaster, is a king-size power unit designed for rough use aboard barges, dredges and work boats. An Airco Oxygraph is a key production tool used to quickly and economically flame cut over 25 of its component parts from heavy steel. Airco electrodes—the Easyarc 12—are depended upon for the utmost in strength and welding speed.

Airco Electrodes & Cutting Machines

satisfy design and strength needs for unique outboard engine

The Mathewson Machine Works Inc., have been manufacturers of marine equipment since 1885. They find in building the Harbormaster that the extensive use of Airco electrodes, cutting equipment and industrial gases combine to provide them with the greatest degree of production flexibility and the widest margin of economy.

From planning to production you can rely on assistance—and completely unbiased recommendations—from Airco Technical men. For Airco is the leading supplier—manufacturer of all kinds and every type of welding and flame cutting processes, their controls, supplies and accessories.

Write to Airco for free literature on electrodes, cutting apparatus, and cutting machines.

WELDING SHOW

VISIT OUR BOOTH

welding
AT THE FRONTIERS OF PROGRESS YOU'LL FIND . . .

AIRCO

Offices and dealers in most principal cities

AIR REDUCTION SALES COMPANY

A division of Air Reduction Company, Incorporated, New York 17, N. Y.

On the west coast—
Air Reduction Pacific Company

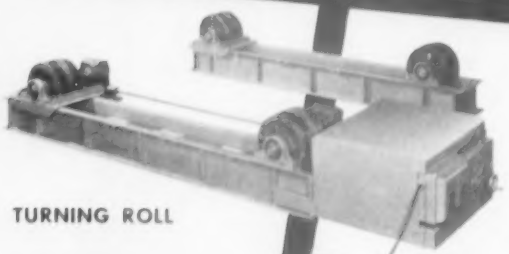
Internationally—
Airco Company International

In Cuba—
Cuban Air Products Corporation

In Canada—
Air Reduction Canada Limited

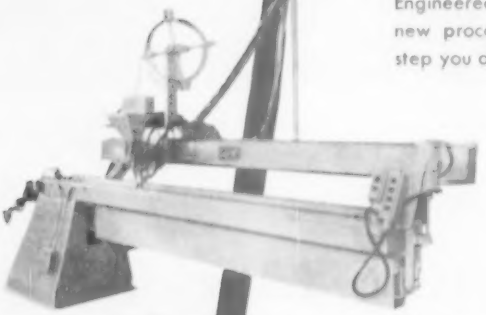
Products of the divisions of Air Reduction Company, Incorporated, include: **AIRCO** — industrial gases, welding and cutting equipment, and acetylenic chemicals • **PURECO** — carbon dioxide, liquid-solid ("DRY-ICE") • **OHIO** — medical gases and hospital equipment • **NATIONAL CARBIDE** — pipeline acetylene and calcium carbide • **COLTON** — polyvinyl acetates, alcohols, and other synthetic resins.

Complete Tank Automation

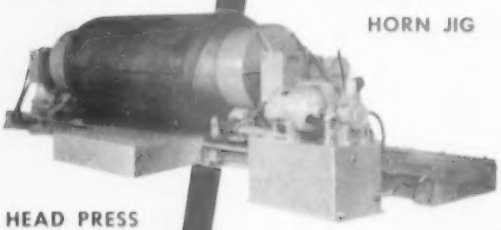


TURNING ROLL

A completely synchronized high-speed production package for all sizes, from small range boilers to large storage tanks. Engineered to take advantage of new process developments and to step you ahead of your competition.



HORN JIG



HEAD PRESS

- Bending Rolls
- Horn Jigs
- Head Presses
- Girth Welders
- Flue Presses
- Turning Rolls
- Drilling and Tapping Machines
- Handling Equipment

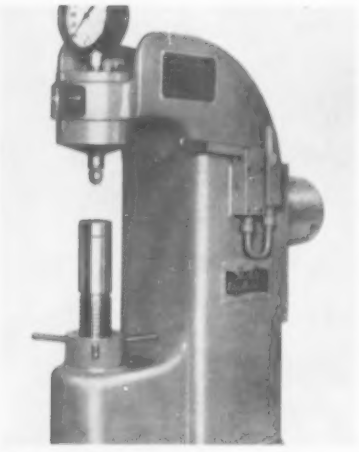
Send for Complete Information (please specify tank sizes.)

- SEAMERS
- TRAVEL CARRIAGES
- CUSTOM WELDERS
- TURN TABLES
- WIRE REELS
- PEDESTALS
- POSITIONERS
- BEAMS

Cayuga

- DESIGNERS
- BUILDERS
- CONSULTANTS
- PROCESS DEVELOPMENT

MACHINE & FABRICATING CO., INC.
Depew - Buffalo, New York



Hardness tester

BENCH type Brinell hardness tester is a motor-operated hydraulic machine. Designed for laboratory and shop use, tester has finger-tip load adjustment and long stroke to eliminate anvil height adjustments.

Load is controlled by relief valve. Movement of Brinell ball is slow and gradual to avoid impact or overloading. Vertical opening is adjusted by elevating nut. *Steel City Testing Machines, Inc.*

Circle No. 22.

Generator

AIR-COOLED electric generating plant is available in 3,500 and 5,000 watt a-c sizes. Generator is powered by two-cylinder gasoline engine. Unit is ideal where quiet smooth running and economy of space are necessary.

Two models "305CCK" and "5CCK" are available in 60 or 50-cycle; 115, 230 or 115/230 volt, single phase, and 230-volt, three-phase, three-wire. There is choice of standard remote control, portable or manual starting models. *D. W. Onan & Sons, Inc.*

Circle No. 23.

Thyratron

RUGGED, industrial 6.4-amp Xenon thyratron is for use with any type of load, without addition of "cushion circuits." Thyratron is said to be unaffected by ambient temperature changes; may be operated in any position.

Thyratron is available with three types of basing: lug-type; socketless bracket mounting with flexible leads with lugs; standard four-pin industrial socket base. *Shivell-Hall Co.*

Circle No. 24.

For more information use card on page 117

high temperature

high pressure

for welding vessels

MUREX®

CROLOY® gives that extra margin of safety

Welders enjoy an extra margin of safety when they use Murex CROLOY electrodes on chrome-moly steels being fabricated for high temperature — high pressure service. Here's why:

- **CROLOY** deposit has higher ductility in the as-welded condition than chrome-moly weld metal.
- **CROLOY** weld metal is insensitive to quench.
- Slag inclusions are almost an impossibility.
- **CROLOY** electrodes are easy to handle — almost any welder can qualify . . . no extensive training is necessary.
- Underbead cracking is practically eliminated.

Murex CROLOY electrodes simplify preheat operations . . . for many jobs allow lowering of pre-heat temperatures from previous levels. They can be used at higher amperages for higher rates of deposition. Deposits are finely rippled, free from porosity, and will readily pass radiographic inspection.

Write our Welding Division now for further information, or ask a Murex man to call.

See us at Booth 74
Buffalo, N. Y., May 9-11

WELDING SHOW

WELDING SUPPLIES
RADIOGRAPHIC EQUIPMENT
PLATING MATERIALS
ORGANIC COATINGS
CERAMIC MATERIALS
TIN & TIN CHEMICALS
METALS & ALLOYS
HEAVY MELTING SCRAP

METAL & THERMIT
CORPORATION
100 EAST 42nd STREET • NEW YORK 17, N. Y.

Weld-O-Vent

"World's Finest Exhaust Systems"

Welding Fume Exhausters

MANY EXCLUSIVE FEATURES

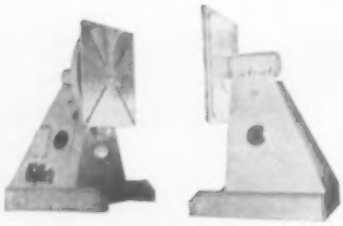
High Velocity Hood Quickly Removes Smoke and Fumes.

- Portable and stationary units for all applications.
- Unlimited flexibility, fast, easy positioning, over 360° radius.
- Blowers can be attached to units or mounted at remote points connecting with ductwork.
- Units can be connected in series.

Available in 9, 12, or 16 feet reach units.

Write For New Application DATA . . .

Engwald Corporation
357 LAFAYETTE AVE.
BROOKLYN, N. Y.



Welding positioner

HEAD and tail stock positioners are for positioning of large weldments such as trailer frames, tank hulls. Units are built in pairs. One consists of constant speed motor-driven head stock; the other consists of an idling type tail stock.

Positioners are available ranging from 5,000 to 32,000 lb capacity. Motor has built-in magnetic brake which stops rotation when control switch is released. *Webb Corp.*

Circle No. 25.

Dust collector

DESIGNED for outside air exhaust, "11NW50" dust collector is for use where recirculating air collectors are not practicable. Collector is said to be ideal where toxic fumes, smoke or dust occur. Collector exhausts fume through a pipe connected to outlet collar at the top of the separator.

Collector has frame-work of welded angle iron and dust drums of sheet metal. Unloading is simplified by flexible hose connected to storage can, and to collector, directing dust to one can while other is removed. *Aget Mfg. Co.*

Circle No. 26.

Lightweight hose

LIGHTWEIGHT hose is constructed of synthetic materials. It is claimed capable of handling air at temperatures to 400 F, and working pressures of 100 psi. It can be made with inside diameters from $\frac{3}{4}$ to 5 in., in lengths to 50 ft. *H. K. Porter Co., Inc.*

Circle No. 27.

Electrode holder

IMPROVEMENTS in the "Hi-Amp" electrode holder give added advantages. Wrap-around fiber glass tip insulator is interchangeable and is said to increase electrical insulation and heat resistance. Red and yellow fiber glass colors aid in identification of holder. *Wagner Mfg. Co.*

Circle No. 28.

A A better way to weld heavy steel plates . . .

B Because *Bux* assures perfect alignment and . . .

C Cost reductions in material and LABOR

Here is the tool that SPEEDS the welding and fabricating of heavy steel plates.

The ***Bux*** portable, magnetic plate clamp delivers perfect alignment with just the flip of a switch. No dogs or wedges. As shown in the illustrations, the ***Bux*** portable plate clamp is easily moved along the seam to be welded, holding the plates in a powerful magnetic field.

Today is the best time to find out how ***Bux*** portable magnetic plate clamps can put SAVINGS in your welding and fabricating operations. Your ***Bux*** dealer can show you how. See him, or write for fully discriptive literature to Buck Mfg. Co., 106 Roberts Road Los Gatos 5, California

DIRECT PULL-OFF PRESSURE . . 3000 lbs.

BUX portable magnetic plate clamps

HELIARC Cutting

TRADE-MARK

CUTS ALUMINUM AT SPEEDS UP TO 300 INCHES PER MINUTE

HELIARC cutting, a new process developed by LINDE, brings all the desired features of economical high-speed operations to the cutting of aluminum.

★ **Speeds never before possible:** Normal mechanized cutting speeds are 300 in. per min. in ¼-in. material, 125 in. per min. in ½-in. material, 75 in. per min. in ¾-in. material, and 50 in. per min. in 1-in. plate. If desired, lower speeds can be obtained by simply adjusting the controls.

★ **Straight lines, bevels, contours—no problem:** The new HELIARC cutting process can be used mechanically or manually. Both setups produce high-quality straight line cuts, bevels, circles, and shapes with revolutionary new speed and efficiency.

HELIARC cutting employs a high-temperature, high-velocity, constricted arc between a tungsten electrode and the piece to be cut. The concentrated, columnated energy of the arc stream melts and ejects a thin section of metal to form a kerf. The gas atmosphere (a combination of argon and hydrogen) prevents oxidation of the cut face.

Learn the details of how HELIARC cutting can help you increase production and cut operating costs. Call your LINDE Representative today.

Linde Air Products Company
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto

"Heliarc" and "Linde" are registered trade-marks of Union Carbide and Carbon Corporation.

Linde
Trade-Mark

STOP
FUMES
at their
source
You'll find Ruemelin Fume Collectors ideal for stopping noxious welding fumes at their source. Counter-balanced inlet hood stays in working area, automatically. Improves working conditions . . . lessens fatigue . . . paves the way for increased plant production. Thousands in everyday service. Write for Fume Collector Bulletin No. 37E.
(left) "Illustrating the 15 ft. reach collector. Handles large or small work. Units available with 9 ft., 15 ft., 17 ft. and 20 ft. reach."

RUEMELIN MFG. CO.

MFRS. & ENGRS. • SAND BLAST & DUST COLLECTING EQUIPMENT
3880 NORTH PALMER STREET • MILWAUKEE 12, WISCONSIN, U. S. A.

a NEW product . . .
means NEW time saving . . .
important NEW production gains!

York's

SPAT-R-PRUF COMPOUND 106

Don't sputter about spatter . . .
JUST WIPE IT OFF!

Completely eliminates grinding after welding. Just one coat, and spatter can be wiped away with a dry cloth.

Available 1 or 5 gal. cans, 5 gal. drums

- NO STIRRING OR DILUTION
- NON-TOXIC
- NON-INFLAMMABLE
- NO ODOR
- HARMLESS TO SKIN
- PERFECT PAINT BASE
- HELPS PREVENT RUST
- NO WELD POROSITY

YORK ENGINEERING CO.
3349 W. Ogden Ave., Chicago 23, Ill.

3 in 1 York's '77'
SPECIAL FLUX
FOR GENERAL BRAZING
FOR CAST IRON WELDING
FOR CAST IRON BRAZING

Abrasive

STEEL grit blast-cleaning abrasive is for producing etched finishes. Known as "Steeletts," grit is of high-carbon steel, heat-treated. It is in the same hardness range as chilled iron abrasives.

Abrasive is claimed free from brittle carbides which cause rapid breakdown of chilled iron. Grit shape is said to last for hundreds of cycles, without sharp edges. Available in seven sizes, packaged in 50-lb fiberboard cartons. *Wheelabrator Corp.*

Circle No. 29.

Welding rod

BRAZING rod is non-fuming, high-strength, nickel-brass type of controlled composition for both joining and overlay with oxyacetylene process. It will bond readily to copper, nickel and iron base metals and alloys.

Termed "Ampco-Braz No. 1," it can be used for build-up of bearings, cams, etc. Deposit also provides good corrosion-resistance to many acids, mild alkalies and salt water. It comes in 1/16, 3/32, 1/8, 3/16 and 1/4 in.; 36-in. lengths; either 10-lb fiberboard tubes or 100-lb wooden boxes. *Ampco Metal, Inc.*

Circle No. 30.

Rectifier

HIGH voltage germanium rectifier is for d-c application. Newly designed power supply is rated at 500-kw output, at voltages ranging from 65, 150, 250 volts. The 500-kw unit can be installed in multiple.

This type of unit offers efficiency ratings up to 95%, states manufacturer, combined with a high power factor and close inherent regulation. *Rapid Electric Co.*

Circle No. 31.

Exhauster

STEEL plate exhauster is designed for removal of industrial waste materials. Exhauster is compact unit, occupying minimum space.

Available with direct or V-belt drive, exhauster is furnished with three different wheels to meet variety of requirements. Fan blades are welded for greater strength. Models are available in two classes—Class I for temperatures from 70 to 600 F; Class II for 601 to 1,000 F; volumes to 50,540 cfm. *Chicago Blower Corp.*

Circle No. 32.

For more information use card on page 117

MAIL THIS COUPON...

you'll find out how you can

Cut Your Costs

DRAWALLOY CORP., YORK 12, PENNA.

Send me the facts on Wear-O-Matic fabricated wire.

Name_____

Company_____

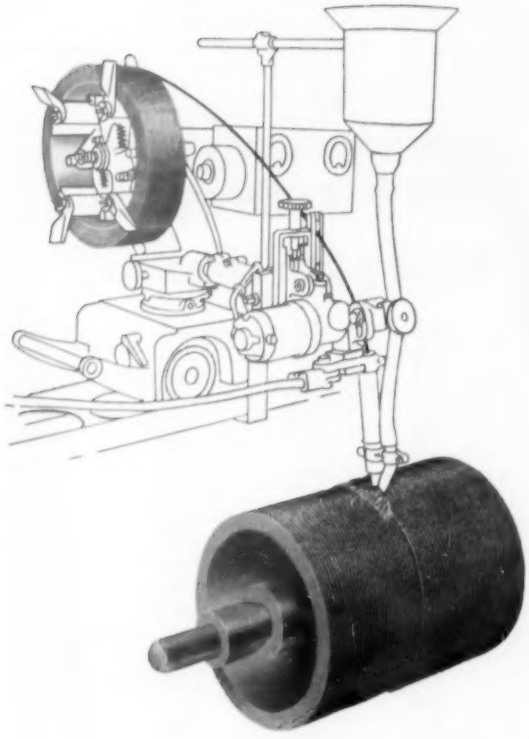
Address_____

with

Wear O Matic

FABRICATED HARD-FACING WIRE

for Automatic and Semi-Automatic Applications



Longer Part Life

The alloying elements in Wear-O-Matic wire are compressed to guarantee *uniform hardness* in every inch of the weld metal. This assures uniform wear resistance for *longer part life . . . higher operating profits.*

Easier To Use

Wear-O-Matic fabricated hard-facing wire gives you smooth, easy feed with *any* automatic head—*without* special feed rolls or contact tubes, *without* any danger of wire crushing or seam opening. That's because Wear-O-Matic is re-drawn to perfect roundness to add extra strength and make it as easy to use as solid welding wire.

And Wear-O-Matic fabricated wire has these additional cost-cutting advantages. Wear-O-Matic wire is electroplated with copper to prevent surface rust and provide positive electrical contact. It's available in six hard-facing and build-up alloys, packaged on twist-free, layer-wound coils of approximately 100-pounds each.

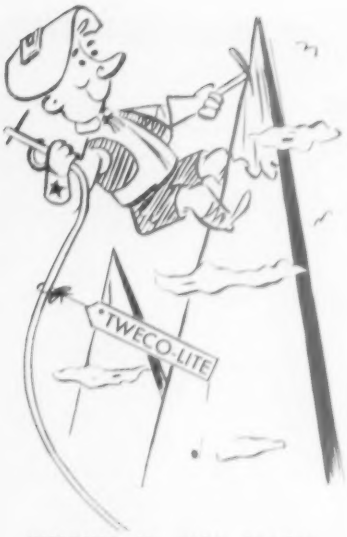
Get the facts now...

see your Drawalloy distributor or mail the top-placed coupon to Drawalloy Corporation, York 12, Pa.

Drawalloy

CORPORATION

YORK, PENNSYLVANIA



WELDING IN HIGH PLACES IS EASIER WITH

***TWECO-LITE**

*the new ALUMINUM welding cable that weighs half as much, lasts longer and costs less

Send for free catalog

A Product of
TWECO PRODUCTS COMPANY
Wichita 1, Kansas

NEW PRODUCT BRIEFS

Metal cleaner is for use in cold cleaning and degreasing. Cleaner is non-toxic and non-flammable. *Manufacturers Processing Co.*
Circle No. 33.

Electric metal-cutting tool, "Model HN Nibbler," is for precision cutting of heavy gage sheet metals, ferrous and non-ferrous. It is portable and easily maneuvered. *Fenway Machine Co.*
Circle No. 34.

Gear reduction transmission "Zero-Max" is said to have infinitely variable speed from true zero to ¼ input speed. *Revco, Inc.*
Circle No. 35.

Safety "Handrift" hammer, for set-up work with machine tools, has hollow chamber to prevent head mushrooming under impact. A 2½-lb model is for controlled tapping. *Custanite Corp.*
Circle No. 36.

Full area port is feature of ¾-in. general purpose, 2-way solenoid valve; can handle oil, water, gas, etc., up to 125 psi. *Automatic Switch Co.*
Circle No. 37.

Heating "Electrothermal" tape is knitted, suitable for surfaces with double curvature. Can be repositioned without rewinding, states manufacturer. *Arthur S. LaPine & Co.*
Circle No. 38.

Penetrating oil "Nu-Aero" in dispenser is for loosening frozen fittings, nuts, bolts, etc. Claimed effective under extreme conditions. *Pressure Products Co.*
Circle No. 39.

Small mercury plunger-type relay can handle load to 20 amp; is only 3½ in. high, 1¾ in. wide, 1½ in. deep. *Ebert Electronics Corp.*
Circle No. 40.

Smooth, easy cutting of ferrous, non-ferrous materials with minimum burr is feature of "Valor" saw. Can be used for wet or dry cutting. *Victor Engineering Corp.*
Circle No. 41.

Tempilstik° FOR ALL
HEAT-DEPENDENT OPERATIONS

looks like a crayon... marks like a crayon... tells temperatures like a precision instrument!

Sixty-three different compositions enable you to determine and control working temperatures from 113° to 2000° F. TEMPILSTIK° marks on workpiece "say when" by melting at stated temperatures—plus or minus 1%.

ALSO AVAILABLE IN LIQUID AND PELLET FORM...WRITE "WELDING SALES" DEPT. FOR SAMPLE TEMPIL° PELLETS...STATE TEMPERATURES OF INTEREST—PLEASE!

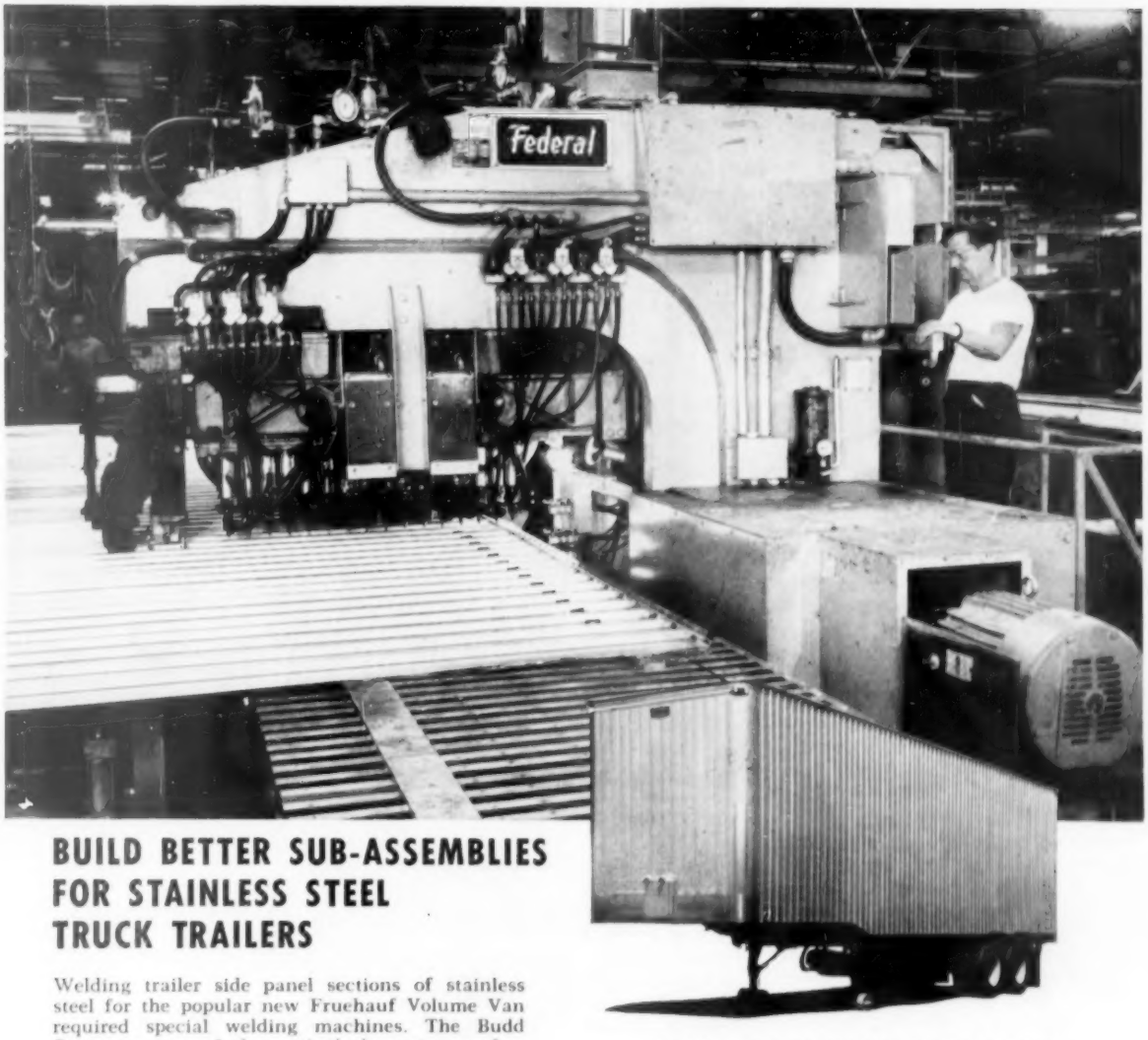
Tempil°
CORPORATION
132 WEST 22ND STREET, NEW YORK 11, N. Y.

Available in these Temperatures (F.)

113	375	1000
125	388	1050
138	400	1100
150	413	1150
163	425	1200
175	438	1250
188	450	1300
200	463	1350
213	475	1400
225	488	1450
238	500	1500
250	550	1550
263	600	1600
275	650	1650
288	700	1700
300	750	1750
313	800	1800
325	850	1850
338	900	1900
350	950	1950
363		2000

VISIT US AT BOOTH 207—MAY 9-11, WELDING SHOW—BUFFALO, N. Y.

How Federal Helps Budd...



BUILD BETTER SUB-ASSEMBLIES FOR STAINLESS STEEL TRUCK TRAILERS

Welding trailer side panel sections of stainless steel for the popular new Fruehauf Volume Van required special welding machines. The Budd Company, one of the nation's largest manufacturers of transportation equipment, naturally, turned first to Federal.

Federal, in cooperation with Budd, designed and built an ingenious "C" frame multi-spot traveling welder that turned the difficult job of welding side frame panels and structural skirt sections into a high production operation.

Self-propelled on 120 feet of rail, the machine travels over the work which is laid horizontally on a copper shunt die back-up fixture. It features an adjustable slow speed for indexing with a rapid traverse for return. Two rows of tandem piston, double-acting air guns are indexed at right angles to the line of welder travel to permit close spot welding. The machine automatically positions itself and selects gun sequence. Operator, riding with the machine, always has clear view of work, ready access to controls.

Stainless steel sub-assemblies for the Fruehauf Volume Van (above) are fabricated by the Budd Company for Fruehauf.

If your operation calls for special resistance welding — you, like leading manufacturers, should call on *Federal — First in Resistance Welding*.

WELDING SHOW

Booth No. 73

THE FEDERAL MACHINE AND WELDER COMPANY

WARREN, OHIO

Federal WELDERS

Warco PRESSES

AIRCO

WELDING and BRAZING Hints

PROBLEM:

To weld and braze aluminum

SOLUTION:

Airco #718 Aluminum Brazing Rod. This free flowing rod (at 1050°F.) maintains low flow temperature and assures good penetration of aluminum brazing alloy at the joint. Recommended for brazing aluminum assemblies having base metals of 52S, 61S, 63S and other compositions.

Airco #25 Drawn Aluminum Rod. Composed of commercially pure aluminum composition known as 2S. Recommended for welding base metals of 2S and 3S analysis.

Airco #26 Drawn Silicon-Aluminum Rod. This rod is generally recommended for repair jobs when there is doubt as to the analysis of the aluminum parts to be welded.

Napolitan Sheet Aluminum Welding Flux. Formula 40 is unsurpassed for welding aluminum and its alloys in either sheet or cast form. *Formula 42* generally is satisfactory to use for a variety of work where reduction of welding costs is a factor. It is less expensive than formula 40.

Airco Aluminum Brazing Fluxes. Formula 44 is designed, primarily, for furnace brazing of brazable alloys. *Formula 60* is primarily for torch brazing of aluminum.

Send for this free catalog!
You'll find here the finest rods and fluxes for joining both ferrous and non-ferrous metals. Write Airco at address below.
Request Catalog 9-WE

AIRCO
AIR REDUCTION
New York 17, N. Y.
Offices and dealers in most principal cities
On the west coast—
Air Reduction Pacific Company
Internationally—
Airco Company International
In Cuba—
Cuban Air Products Corporation
In Canada—
Air Reduction Canada Limited

NEWS . . . . . *from page 6*

ditional distribution facilities throughout the country. The Chicago plant will produce liquid oxygen, nitrogen and argon; production is planned during the last quarter of this year. The plant at Alton, Ill. scheduled for completion by mid 1956, will serve southern Illinois. The Calvert City plant, also scheduled for completion by mid 1956, will supply the lower Ohio Valley.

This is the third Air Reduction plant to be built in Calvert City. The first was the National Carbide division's calcium carbide and acetylene generating plant. The Air Reduction Chemical Co. division is just completing a vinyl acetate monomer plant in this same area.

This expansion plus new facilities completed since 1951 throughout the country bring Airco's total investment increase in the gas-producing field over the six year period to $50,000,000

Selas Corp. in new plant

Selas Corp. of America has moved into its new million-dollar plant at Dresher, Pa., just north of Philadelphia. The plant, located on an eleven-acre site, concentrates research and development in one building.

The manufacturing plant adjoins the laboratory. A third building houses engineering, administrative office and service facilities. Selas develops, designs and manufactures brazing machines and other heat processing equipment. The firm was formerly located in Philadelphia.

Walworth acquires Conflow Corp.

Assets of Conflow Corp., Philadelphia, have been bought by Walworth Co., New York City. Conflow is a producer of pneumatic automatic valve control equipment. This marks the fourth acquisition by Walworth in recent months. Conflow will operate as an independent subsidiary, retaining present management.

ASEE meeting at Iowa State

The annual meeting of the American Society for Engineering Education will be held June 25-29 at Iowa State College, Ames.

Choose Huntsman angle-shape for
- reduced glare from behind
- better top-of-head protection
- easy fit in your toolbox
- scientific upward ventilation
- longer helmet life

Specify the complete line of quality-built, guaranteed products

HUNTSMAN "face savers"
WELDING HELMETS, FACE SHIELDS & ACCESSORIES
Kedman Co., 233 So. 5th West, Salt Lake City 1, Utah

"Overweight WELDING CABLE COSTS YOU Time & Money"

TWECO-LITE

— the new flexible ALUMINUM welding cable that weighs half as much, lasts longer and costs less

Send for free catalog

A Product of
TWECO PRODUCTS COMPANY
Wichita 1, Kansas

TERRIFIC HEAT !

HARRIS SUPER-HEAT TORCH NO. K23

Heat is the Prime Factor utilized in connection with innumerable Metal Working Operations. While it is a fact that the Oxy-Acetylene Welding Torch is universal in its applications, there are many Operations requiring a much greater volume of Intense Heat than can be obtained from a Welding Torch.

A definite limitation exists relative to the amount of Oxygen and Acetylene Gases which can be safely mixed without danger of the Flame "Back-firing", due to the extremely fast Flame Propagation Characteristics of such Gas Mixtures. On the other hand, much larger volumes of such Fuel Gases as Propane, City Gas and Natural Gases can be safely mixed with Oxygen on account of their lower rate of Flame Propagation. It is evident the larger the volume of Gases mixed, the greater the Flame and resulting Heating Value. This produces the truly phenomenal results achieved by this Harris Super-Heating Torch.

The applications of this Harris Torch are unlimited, where large volumes of Intense Heat are required, either as a Portable or Stationary Unit. In places where Massive Shafts are to be Straightened; Large Size Pipe Bent; Flanging or Straightening of Steel Plates; Brazing Heavy Copper Pipe, etc., etc., this Harris Torch, with its **TERRIFIC HEAT**, is the answer.

HARRIS 1905 50 1955 ANNIVERSARY

SEND FOR DESCRIPTIVE FOLDER NO. 540710

THE HARRIS CALORIFIC COMPANY
CLEVELAND 2, OHIO

NO INJURIOUS FUMES . . .

ANTI-BORAX

No. 2 BRAZING FLUX

For Brass, Bronze, Copper, Steel, Malleable Iron, etc. Causes the bronze to penetrate deeper into the joint—making a stronger union than is possible with other fluxes. High efficiency makes it more economical to use. Melting point 300°.

ALSO

1—Cast Iron Welding Flux
3—Brass, Bronze Welding Flux
4—Flux for Bronze Welding Cast Iron
5—Extra Quality Aluminum Flux for Cast Aluminum Welding
7—Steel Flux
8—Aluminum Flux for Sheet Aluminum
9—Stainless Steel Flux
11—Tinning Compound
12—Burnt Cast Iron Welding Flux
13—Brazing Flux for Extruded Bronzes
14—Special Brazing Flux for Aluminum Bronze, Everdur, and all Silicon Bronzes
15—Special Flux for Magnesium Alloys, Dow Metal, etc.
16—Silver Solder Paste Flux

FOR THE BEST JOB AT LEAST COST

Welders can save more money and get a better job on production work, making special tools, and repair work with the right Anti-Borax product—**order by number.** Send for **free sample** and descriptive circular.

ANTI-BORAX COMPOUND CO., INC.
FORT WAYNE, INDIANA

Industrial research conference at IIT

Motive, management and results of industrial research will be discussed at the first annual National Industrial Research conference. The conference, sponsored by Armour Research Foundation of Illinois Institute of Technology, will be held April 18 and 19 at the Sherman hotel, Chicago. The conference is a highlight of the Foundation's 20th anniversary — 1936-1956.

Purpose of the conference is to provide a forum where common problems can be discussed. Conference chairman is Dr. Haldon A. Leedy, director of the Foundation.

Mallory-Sharon forms Canadian subsidiary

Mallory-Sharon Titanium Corp., Niles, Ohio has joined with Atlas Steels Ltd., Welland, Ont., to form a subsidiary company, Atlas Titanium Ltd. The new subsidiary will supply titanium in finished shapes for Canadian and world markets.

Atlas Steels, Ltd., will have controlling interest in the new firm. Mallory-Sharon will furnish technical knowledge and assistance. Aim of the new firm is to help make Canada self-sufficient in its supply of titanium.

Merit award to Norris-Thermador

A 25th anniversary Award of Merit was recently presented to Norris-Thermador Corp., Los Angeles. The award was presented by the Los Angeles Chamber of Commerce in recognition of Norris-Thermador contributions to the betterment and general welfare of the Los Angeles area.

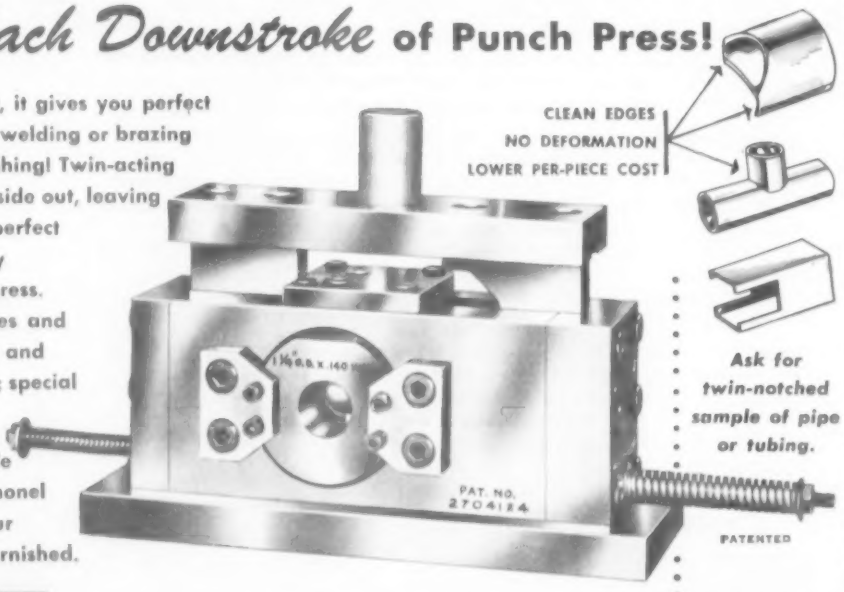
New Norelco office in Newark

The Research & Control Instruments Division, North American Philips Co., Inc., Mount Vernon, N. Y., has established a new office at 96 Bloomfield Ave., Newark, N. J. John O'Conner has been named district manager. The new office will serve the New Jersey-eastern Pennsylvania area, formerly serviced by F. J. Mullowney X-Ray Co., Trenton, N. J.

the ARC-TWIN Double Notches Pipe and Tubing with Each Downstroke of Punch Press!

• SAVING both time and cost, it gives you perfect T-joints—instantly ready for welding or brazing without deformation or finishing! Twin-acting punch shears clean, from inside out, leaving two matching notches (in perfect 180° alignment) with every downstroke of the punch press. Quickly interchangeable dies and punches accommodate pipe and tubing from ½" to 2⅛" O.D.; special units, up to 3" O.D.

Special Arc-Twins for double notching stainless steel or monel metal and units built to your specifications can also be furnished.



Ask for twin-notched sample of pipe or tubing.

VOGEL TOOL AND DIE CORPORATION
1805 NORTH 32ND AVENUE
MELROSE PARK, ILLINOIS

How AMSCO® helps you HARDFACE MORE EFFECTIVELY

The complete line of 15 Amsco hardfacing rods represents a selection of the toughest, hardest alloys available. Among the metals used for alloying are these highly wear-resistant elements—manganese . . . chromium . . . nickel . . . cobalt . . . tungsten . . . molybdenum. Each has particular resistance to certain types of wear—including impact, abrasion, heat, corrosion.

Your Amsco distributor has many helpful methods for selecting the proper hardfacing rod to most effectively combat types of wear you contact daily. *Make him your hardfacing headquarters.*

AMSCO CATALOG MAKES ROD SELECTION EASY

Write for the free catalog, *Amsco Hardfacing Alloys.* It presents complete analyses, metallurgical information and other pertinent data about Amsco's complete line . . . making it easy for you to look up the right rod to use in hundreds of common hardfacing applications. It is easy to understand and to apply the suggestions to your own operations. Send for it today.

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Ill.

Only the P & H Arc Welder Line Gives You

Dial-Lectric Control

for faster, better welding at lower cost

Every P&H Arc Welder has time-saving Dial-lectric Control. (You can also use Dial-lectric Control as a remote control at the work — to turn walking time into welding time.) Just a slight turn of the wrist, and Dial-lectric Control gives you the exact heat you want — instantly. Arc striking is fast, easy. Power costs are reduced and welding quality is improved.

You get the advantages of P&H advanced design, too. In P&H Arc Welders there are no moving parts to wear out — no cores, no coils, no gears or levers.

P&H Arc Welders help you maintain production schedules—give you continuous, efficient performance. Write today for more information on the complete line of P&H Arc Welders.

HARNISCHFEGER
MILWAUKEE 46, WISCONSIN

I'M SMOOTH-ARC SCOTTY... and if I had a middle name it would be either thrift or quality. That's why I'm strong for the new P&H Arc Welder line with Dial-lectric Control. Read about it in our FREE catalog.

A. P&H AC WELDERS — Capacities to 625 amps. NEMA rated. Connect to 230/460 volts. Dial-lectric Control for exact, instant heat.

B. P&H AC/DC WELDERS — A flip of the switch gives you AC or DC welding current. Dial-lectric Control. Operates on 230/460 volt, 60 cycle current — single phase. Capacities to 675 amps.

C. P&H DC RECTIFIER WELDERS — 200, 300, 400, 500 amp sizes. NEMA rated. Protect input line against unbalance. Dial-lectric Control.

MAIL COUPON *today!*

P&H HARNISCHFEGER CORPORATION
Welding Division
4513 West National Avenue, Milwaukee 46, Wisconsin

Attention: W. R. Stephens, Sales Manager

I'd like more information on P&H Arc Welders with Dial-lectric Control.

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

3062

the P&H *Line*

P&H welding equipment is manufactured and sold in Canada by REGENT EQUIPMENT MANUFACTURING COMPANY LTD., 455 King Street West • Toronto, Ontario, Canada

TWECO-LITE

— the new flexible ALUMINUM welding cable that weighs half as much, lasts longer and costs less

Send for free catalog

A Product of
TWECO PRODUCTS COMPANY
Wichita 1, Kansas

TILLMAN
Gloves—Garments

WELDORS BUY FROM YOUR DEALER

ASK FOR OUR NEW CATALOG

BRAZILIAN DEERSKIN
THE "STAY SOFT" LEATHER
GLOVES AND MITTENS

TILLMAN PRODUCTS
John Tillman & Co.
Long Beach, Calif.

Caribbean silo stands inspection

A welded silo in Jamaica was recently inspected by radiography. All vertical welding of the silo, 78 ft in diameter and 100 ft high, was examined by representatives of Isotope Products, Buffalo.

Equipment included two iridium sources, two gamma cameras, film holders and processing apparatus.

For this job, as for most radiography of seams on storage tanks and spheres, strip film was used in the inspection unit. The film, $2\frac{3}{4}$ in. wide, in 4-ft strips, was placed in special holders. These holders had built-in lead intensifying screens in front and back. They were closed with plastic zippers. Nearly 1,000 ft of welding was inspected in a few weeks.

Sylvania plans new building

Sylvania Electric Products Inc., New York City, will build an engineering and pilot production building in Towanda, Pa., for its tungsten and chemical division. Construction of the new 48,000-sq ft building will begin late this year, with completion scheduled in the summer of 1957.

The three-story brick structure will contain development and testing laboratories, and pilot production facilities.

Solar Steel buys United Pipe Co.

United Pipe Column & Railing Co., Norristown, Pa., was recently purchased by Solar Steel Corp., Cleveland. United Pipe, a fabricator of structural columns and railings, will operate as a division of Solar Steel. Roy Epner has been appointed plant manager.

NEW
HELMCO-LACY

10 lb. size $26.00

Immediate delivery

5 lb. size $24.50

FLUX-POTS
for fast efficient flux handling!

This is the first product specifically designed to warm and maintain brazing flux at a constant, efficient holding temperature. Two convenient sizes . . .

- ★ **save up to 50% of the flux!**
- ★ **prevent overheating and underheating!**
- ★ **save time, materials, labor!**
- ★ **reduce rejects and reworking!**

Investigate this low-cost, labor saving, material saving means of handling flux for industrial uses. Especially valuable where volume work is required for manufacturers' assembly and repair operations.

Helmco-Lacy

7400 W. Lawrence Ave.
Chicago 31, Illinois

***TWECO-LITE**

*the new flexible ALUMINUM welding cable that weighs half as much, lasts longer, costs less

Send for free catalog

A Product of
TWECO PRODUCTS COMPANY
Wichita 1, Kansas

World steel output soars

Steelmaking countries of the world produced a record total of 294,000,000 net tons of raw steel in 1955, according to the American Iron & Steel Institute, New York City. This total was 20% greater than the 1954 output and represents a 39,000,000 ton increase over the record of 255,000,000 tons in 1953.

KSM Products opens new district office

KSM Products, Inc., stud welding division, Merchantville, N. J., has opened a new district office at 1615 Polk St., San Francisco. F. G. Kern will represent the company as district engineer in California.

Metal & Thermit expands Canadian operations

Metal & Thermit Corp., New York City, and United Chromium of Canada, Ltd., Toronto, will combine Canadian activities under the name of Metal & Thermit-United Chromium of Canada, Ltd.

Plans include construction of new office, warehouse and plant facilities in Toronto. The new facilities will be built in the northwest section of Toronto on a four-acre tract.

In addition to United Chromium products, the new plant will manufacture welding products and industrial chemicals formerly produced in the United States. James Guffie has been named manager. He was manager of United Chromium of Canada, Ltd.

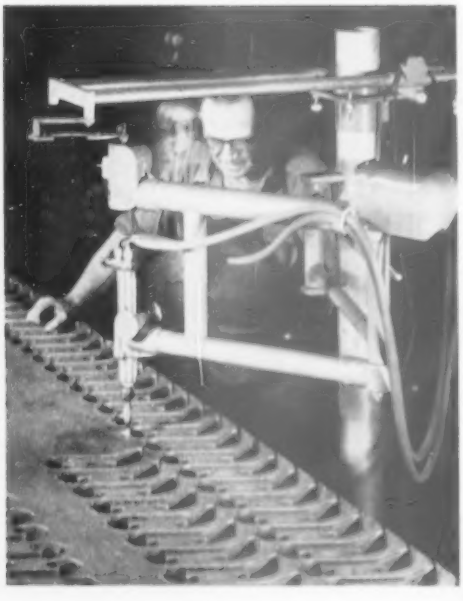
Titanium producers discuss problems

Representatives of five major titanium producing companies met with representatives of Solar Aircraft Co., San Diego, last month to discuss techniques and problems of titanium fabrication.

The meeting, believed to be the first of its kind in this country, was held at the Municipal Airport Terminal Building, San Diego. Participating firms were Mallory-Sharon Titanium Corp., Titanium Metals Corp., Rem-Cru Titanium Inc., Republic Steel Corp., and Sharon Steel Corp.

New Heath Ultra-Graph

OXYGEN CUTTING



FOR AUTOMATIC, PRECISION METAL CUTTING

5 to 7 times faster than hand torch cutting

Templates made from easily cut lightweight steel; magnetic tracer arm automatically holds true tolerances for repetitive production. Duplicates intricate flat shapes, cuts holes in pipe, tubing, round bars.

- Precision to ± 1/64th".
- Surface finishes are as smooth as 170 micro inches.
- Cuts 1/8" to 16" thick stock.*
- Cuts circles from 1/2" to 72" dia.; straight lines to 144".*

*depending on model

Ultra-Graphs Simplicity results in PRECISION and LOW COST

Sizes from $350 to $1000 fob factory

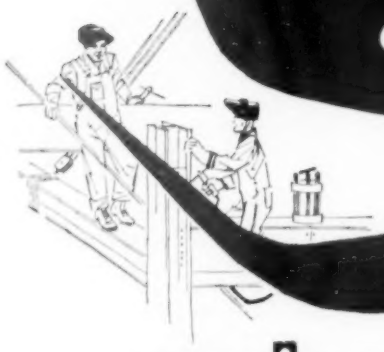
WRITE FOR NEW FOLDER

Heath ENGINEERING COMPANY

151 AULT ROAD
FT. COLLINS, COLO.

DISTRIBUTORS IN PRINCIPAL CITIES

hear about . . . the new **miller** MULTI ARC *combination ac-dc welders?*



SRAC ac-dc WELDERS . . .

. . . get metallic arc welding jobs done in a superior, time saving way because:

- Operator selects instantly, (1) ac, (2) dc straight polarity or, (3) dc reverse polarity. Here's versatility.
- Patented UNITRAN control circuit eliminates mechanical controls. Here's efficiency.
- No moving parts, plus excellent electrical qualities reduce maintenance and operating costs. Here's savings.

Available in 200, 300, or 400 ampere models with ratings at 60% duty cycle. Power Factor Correction can be supplied.

SRTA ac-dc WELDERS . . .

. . . for BOTH inert gas and metallic arc welding. Instant change from ac to either straight or reverse polarity dc. Power Factor Correction on all models. UNITRAN control circuit removes need for mechanical control and delivers outstanding uniformity throughout welding range. Built in high frequency, combined with balancing resistor, which is in series with transformer secondary, make this the welder for inert gas *and* metallic welding.

Available in 200 and 300 ampere models, rated at 60% duty cycle.

" . . . if it's MILLER you know it's the finest . . . "

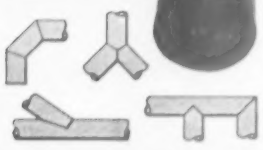
New

MILLER ARCWELD welding electrodes are worthy of the MILLER name and reputation. Ask your distributor for some . . . you'll *like* the job they do.

miller

ELECTRIC MANUFACTURING CO., INC.

APPLETON, WISCONSIN



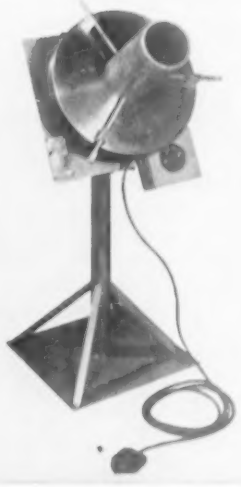
SAVE TIME AND MONEY!

A SMOOTH SWING of the Contour Marker's soapstone point and you're ready to cut! It's easy and *absolutely accurate* because there is an angle dial calibrated in both degrees and pitch. Any of the pipe joint angles shown can be marked off in minutes. And you save "man hours" as well as oxygen and acetylene gas because "cut and try" methods are completely eliminated. Two sizes are available complete with adapter for marking structural steel. Standard, for pipes from 1½" to 18" dia.; Jumbo, for pipes from 16" to 48" dia. Instruction book included. Belt case available. Write for information

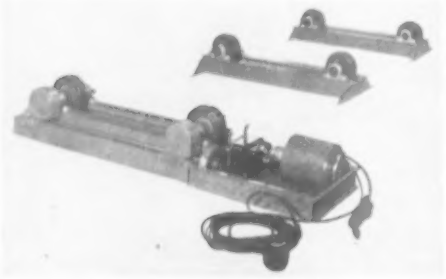
CONTOUR MARKER CORPORATION OF CALIFORNIA
1843 E. Compton Blvd., Compton, California • NEwmark 1-9474

THE CONTOUR MARKER

DO A MILLION JOBS BETTER



Use UNIQUE *Equipment For A Perfect Weld Every Time*



Light-duty Bench and Floor Model Positioners Capacity 150 lb.

Powered Turning Rolls and Idlers Capacities from 500 lb. to 75 tons

UNIQUE TURNTABLE & EQUIPMENT CORPORATION
122 Sumpter Street Brooklyn 33, N. Y.

Ancient Egyptians used abrasives on weapons

The ancient Egyptians were using abrasives to sharpen weapons as far back as 3,500 years ago. A steel dagger and a fine-grained sandstone from this period have been found by archeologists, according to Electro Refractories & Abrasive Corp., Buffalo.

Sculpture is welded stainless

Sculpture of stainless steel, created by artist José de Rivera, is partly the result of welding. His abstractions, which have been called "the essence of airy grace and buoyant optimism," seem to bring forth the smoothness and grace of the metal.

The technique of welding has aided in creating this impression for it is a method which readily lends itself to creation of smooth joints. Many of José de Rivera's pieces are hollow, requiring that two pieces be shaped separately until they match perfectly. The sections are then welded and smoothed until the joint is invisible.

—*Electro Metallurgical Co.*

New AWS section in Shreveport

A new section of the American Welding Society has been formed in Shreveport, La. Members in the section are drawn from 24 different industries in the Shreveport area.

Officers are J. L. York, chairman; Joy Kelley, first vice-chairman; E. B. Reeves, second vice-chairman; Alton Henderson, secretary; Hollis Greene, treasurer. The section held its first technical meeting Oct. 22 and was officially activated Nov. 1, 1955.

COMING EVENTS

MARCH 12-14: Fifty-sixth Annual Convention, International Acetylene Association, Hotel Statler, Los Angeles.

MARCH 19-22: Twelfth Annual Convention, National Welding Supply Association, Hotel Roosevelt, New Orleans.

APRIL 27-28: First Santa Clara Valley Welding Show and Clinic, Engineering Bldg., San Jose State College, San Jose, Calif.

MAY 8-11: Thirty-seventh Annual Meeting, American Welding Society, Hotel Statler, Buffalo.

MAY 9-11: Fourth Annual Welding Show, Memorial Auditorium, Buffalo.

OCT. 8-12: National Fall Technical Meeting, American Welding Society, Cleveland.

OCT. 8-12: Thirty-eighth National Metal Exposition and Congress, Cleveland Public Auditorium, Cleveland.

COMING....JUNE 15th

for the 14th time

1956 **Welding Engineer** MID-JUNE

FACT FILE issue

Now in 10 Big Sections—Based on the NWSA Tab-Index System

Automatic Equipment.... Filler Metals, Fluxes.... Safety & Medical Equipment
Gases
Gas Equipment
Arc
Resistance
Inert Gas
Materials
Industrial Equipment

Each section will include information-packed data sheets for on the job problems, in addition to product classification listings pertaining to the specific process or field. Categorized listings make reference easier . . . instantly puts complete information at the user's fingertips.

EXTRA: The Trade Name Index plus Manufacturers' Names and Addresses

This special issue will work the year 'round for the reader by providing him with a complete Buyer's Guide of product listings. Also included is an accurate Reference Data section of short-cut tables and other units of useful technical and engineering data. *As it works for the reader, this issue works also for the advertiser!*

Your advertisement becomes part of the work day of thousands of welding equipment users as they seek out the reference and purchasing data to help them in their jobs. What better reason for putting the FACT FILE issue on your schedule?

1. Sent to ALL WELDING ENGINEER subscribers—over 20,000 of them.
2. A useful selling life of one year.
3. The only buyer's guide with audited circulation. You know the titles of those who receive it.
4. The ONLY welding publication of its kind with technical and engineering data AND a complete buyer's guide.
5. The oldest and most complete buyer's guide in the welding industry.
6. Ten great sections of welding know-how and purchasing source information.
7. The buyer's guide sent exclusively to those with buying influence in the welding industry.
8. A long-lived sales-helper; in daily contact with more paid welding management subscribers than any other welding publication in the world.

Make your SPACE Reservations NOW!

CLOSING DATE: Friday the 11th of May

Welding Engineer

12 EAST GRAND AVENUE, CHICAGO 11, ILL.

REDUCE CYLINDER HANDLING up to 50%

with INDEPENDENT
Gas Supply TRAILERS

TRANSPORTING — Argon — Carbon Dioxide — Helium — Nitrogen — Oxygen — Boron Trifluroide — Hydrogen — Ethylene. Trailer capacities from 187,000 cu. in. to 750,000 cu. in. water capacity. Trailer tubes ICC3A-2400 Specifications with 2400 PSIG Working Pressure.

INDEPENDENT ENG CO. Inc.

CONSULTING · RESEARCH · DESIGNING

O'FALLON 5, ILLINOIS

Sizes and weights to meet all State requirements.

Can be mounted on bases for permanent storage.

Tensile Testing

Fast!
Accurate!
Easy!

This compact machine tests spotwelds, strip, wire, anything within its 20,000 lb. capacity. Hydraulically powered, it has an easily controlled ram, self-acting specimen grips that are open sided for easy specimen insertion. This tester, Model ST-1, is adjustable to take specimens 5" to 9" in length. Various load gauges, grips, and other modifications are available.

Write for more information — give us your requirements.

DETROIT TESTING MACHINE COMPANY

9380 Grinnell Ave., Detroit 13, Mich.

B&W to build reactor fuel

A lump-sum contract to build reactor fuel elements has been awarded to Babcock & Wilcox Co., New York City, by the Atomic Energy Commission, Washington, D. C. The contract requires at least 325 fuel element assemblies to replenish the core of the reactor at Arco, Idaho.

Weldor, not welder, scores again

Another gain has been made in the battle of words. Greer Shop Training, Inc., Chicago vocational school, uses "weldor" exclusively to designate a welding operator. The school's latest booklet on welding uses weldor throughout, including the title—"The Modern Weldor."

Arc welding ideas invited

The James F. Lincoln Arc Welding Foundation, Cleveland, is offering $20,000 in cash awards for ideas that will accelerate progress in arc welding.

Residents of the United States or its possessions may submit ideas on any aspect of arc welding that can be used to advance welded design, welding engineering or the general application of the arc welding process.

No restrictions are placed on the nature or extent of ideas that may be submitted. Complete information and rules are available from the Foundation.

Welded titanium insert is important condenser part

Lightweight titanium continues to play an important part in industry. Known for its corrosion-resistant qualities, titanium sponge was recently used to fabricate a "top hat insert" for a chemical condenser.

The insert consisted of a round, thin piece of titanium about a foot in diameter to which a cluster of 70 thin wall tube inserts of titanium was welded. Welding was done in an air-tight chamber with argon gas as the protective atmosphere.

This part was to protect the most vulnerable part of the stainless steel condenser from corrosion of hot nitric acid. The tubes of the insert were made to fit snugly inside the condenser tubes giving protection to the top 3 in. of the condenser—the area most exposed to the acid.

E. I. du Pont de Nemours & Co., Inc.

GLENN COMPANY
CONSTANT VOLTAGE
News Notes

Is Your Automatic Welding Power Source Outdated?

It is, if you're using variable arc voltage with variable wire feed—and getting variable results!

GLENN Constant Voltage Welders operate at fixed arc voltage, which means fixed wire feed rate for consistently top-quality welding. Results? Better welding, with fewer rejects, at far lower cost!

GLENN CV welders are job-proved for submerged arc, inert gas, CO-2, "squirt" and automatic hard facing and stud welding processes. 4 models—300, 500, 750 and 1200 amp. continuous duty rating, 18-42 v. arc voltage range. Write or wire for literature, application data, prices.

6

GLENN COMPANY
CONSTANT VOLTAGE PIONEERS
3134 E. 10TH STREET
OAKLAND 1, CALIF.
10228 SO. AVE. N.
CHICAGO 17, ILL.

More engineers is goal of ASM award

A total of 140 junior and senior high school students in grades 7-12 will get encouragement this year to specialize in science as a foundation for careers in engineering.

The American Society for Metals, Cleveland, is sponsoring a nationwide Science Achievement Award program in which students will compete for U. S. Savings Bonds. Entries by students may cover any area of science or mathematics. Administration will be under the guidance of the National Science Teachers Association, Washington, D. C.

The ASM hopes, through this program, to help identify those high school students qualified to become engineers of the future.

NACE to confer in New York City

The 1956 conference of the National Association of Corrosion Engineers, Houston, will be held March 12-16 in New York City.

Titanium Metals gets cold rolling unit

Plans for development of a specialized fabricating facility for rolling and forging of titanium have been announced by Titanium Metals Corp. of America, New York City. The firm has ordered a Sendzimir reversing cluster mill for cold rolling of titanium sheet. The new unit will be installed in an Allegheny Ludlum Steel Corp., Pittsburgh-area mill.

Corrosives processed in cast-weld equipment

Cast-weld stainless components are proving valuable in design of processing equipment exposed to corrosive fluids. Particularly in the textile field is it important to maintain purity of dyes. Contamination due to entrapment of old solutions must be avoided.

By using cast stainless alloys resistant to dye process solutions at elevated temperatures and pressures, designers can incorporate streamlined welded parts that eliminate traps, according to the Alloy Casting Institute.

Distributor appointments

Adamas Carbide Corp., Kenilworth, N. J.: Ellsworth Steel & Supply Co., Stratford, Conn.

Make More Money on EVERY Welding Job..

METAL BOND
SOLDERING AND WELDING
PRODUCTS

We have been making Metal Bond Products for more than 25 years and successful Welders all over the country have been using them to advantage.

AIDS TO GOOD WELDING JOBS

- Tinning Compounds • Soldering Salts • Hard Solder • Aluminum Solder • Mouldough • Brazing Flux No. 10 • Special No. 31 • Seal-X-O • Cast Iron Welding Flux No. 4 • All Steel Wire Brushes and Holders.
- Make your own test—also send for our pocket-size catalog which contains information and descriptions of our money-saving METAL BOND Products.

METAL BOND MFG. CO.
MONTGOMERY CITY, MO.
P.O. BOX 215

GET TOUGH
Fibre Glass
Welding Helmets
• ENGINEERED
and Produced by
SELLSTROM

NOW THREE DIFFERENT SHAPED HELMETS with one-piece fronts of compression-molded Fibre Glass—exceptionally tough and shock-resistant! Lighter and more durable than ordinary Fibre helmets. Fibre Glass is a thermo-setting material — outstanding for heat-resistant and non-absorbent characteristics. These helmets retain their shape, can be cleaned and sterilized without warping. Equipped with Sel-O-Matic fast-acting ratchet type headgear.

No. 231

A New Model —
Available with Plastic Headgear

—a durable, yet light in weight Fibre Glass helmet with curved front and extra long straight bottom for face, neck and upper chest protection. The sides extend back, to prevent side flashes, and the large, curved crown protects the frontal head area during all welding operations. Model No. 231 is available with the stationary or lift-front lens retainer equipped with either fibre or plastic Sel-O-Matic headgear or standard headgear.

Write for brochure No. 32-G which gives complete information and prices on the Sellstrom Helmets, and sample No. 231 helmet.

See Us At The Show
Have Your Picture "Took"

Look at the Sellstrom Line of Safeguards at the National Welding Supply Association Show—Roosevelt Hotel, New Orleans, March 19th, 20th, 21st, 22nd. See the new Fibre Glass and other helmets, industrial goggles, face shields and respirators.

Come to the Sellstrom "Studio" Monday, March 19th, and have your picture "took"! FOR FREE!!! Also see our picture show!

sellstrom
MANUFACTURING COMPANY
Eye and Face Safeguards Designed for Utmost Comfort
226 Hicks Road Palatine, Ill.

THIS IS LOW COST WELDING!

When a touch on a button moves weldments like these into the correct, most convenient position for a downhand pass, you get more arc time, more welding at lower cost. C-F power operated Positioners rotate the work in a full circle at any point in a range of 135° from the horizontal—giving welders a choice of an infinite number of downhand welding positions instantly.

Every requirement for faster, better positioned welding—constant or variable speed table rotation, full 135° tilt, self-locking gearing which holds the table in any position, oversize built-in main tilt, and rotating bearings, choice of two base styles, and many other features—are built into C-F Positioners.

C-F Positioners are available in Hand or Power operated models, and are made in capacities up to 30,000 lbs. and larger.

Write for the new C-F Positioner Catalog

CULLEN-FRIESTEDT CO.
1302 S. Kilbourn Avenue Chicago 23, Illinois

CULLEN-FRIESTEDT CO., CHICAGO 23, ILL.

HOW TO

use and apply alloys and fluxes for Soldering, Brazing and Welding Aluminum and Aluminum Alloys

WORLD'S ONE AND ONLY COMPLETE LINE of joining and sealing Alloys and Fluxes for ALUMINUM

Handiest Pocket Reference is designed Particularly to service operator needs Brief • Direct • Available on Request

This small folder is for the man at the torch or welding machine . . . will help him recognize the alloy made especially for the job he has at hand . . . will refresh his knowledge of exactly how to use it. FREE! Single copies or sufficient numbers to supply weldor crews.

All-State WRITE WIRE PHONE FOR YOUR COPY

TWO NEW SOLDERS FOR JOINING ALUMINUM TO OTHER METALS

105 **Medium Temperature Solder** Good for 18,000 psi Shear. This low cost silver solder requires no more than 750 F. for joining wide range of ferrous and non-ferrous metals.

107 **General Purpose Silver Solder** Stronger—20,000 psi shear—and requiring only 600 F. Like 105, good for aluminum, copper, brass, stainless steel, etc.

Your A-S Distributor Now Stocks Both 105 and 107. Ask to see what problems they can solve for you.

ALL-STATE WELDING ALLOYS CO., INC., WHITE PLAINS, N. Y.

Ralph A. Trout has been appointed sales manager of The Harris Calorific Co., Cleveland. *Roy L. Rasmussen* has been named assistant to the sales manager. Mr. Trout has been with Harris Calorific since 1949. Mr. Rasmussen previously was manager of the Cleveland sales branch office.

A. S. Blagden was re-elected president of The Federal Machine & Welder Co., Warren, Ohio. Other officers re-named to office were: *R. N. Leitzell*, vice-president and treasurer; *J. R. Barefoot*, vice-president; *James H. Shinn*, secretary and assistant treasurer.

William T. Wilbur has been appointed chief application engineer by Progressive Welder Sales Co., Detroit. Until recently he had his own firm, specializing in resistance-welding design. He has over 16 years experience in this field. Mr. Wilbur is a member of AWS.

Phil R. Becker has been named general manager of sales by Midwest Piping Co., Inc., St. Louis. He will direct sales for all divisions of the company. Midwest is a fabricator and erector of industrial and power piping systems.

David M. Kasson has been named president and general manager of Brennen, Bucci & Weber, New York City manufacturer of spot and arc welders. Mr. Kasson was previously president of Kasson Die & Motor Corp., L. I. City, N. Y.

Elmer B. Dunkak has been named to the newly-created position of vice-president, sales, of Selas Corp. of America, Philadelphia.

John Caluwaert has been elected vice-president of Industrial Air Products of the South, New Orleans, and *Levon Josephian* has been appointed general plant superintendent by Industrial Air Products Co., Portland. Mr. Caluwaert was previously manager of Industrial Air of the South. Mr. Josephian has 20 years of experience in the oxygen industry. He was formerly employed by Pacific Oxygen Co., Oakland, Calif.

William Troy, Jr., has joined the sales staff of Alloy Rods Co., York, Pa., as a field representative. His territory will include Maryland and south central Pennsylvania; he will make his headquarters in Baltimore.

Dr. John D. Leitch has been named vice-president, engineering, and *Alvin C. Dyer* has been named vice-president and general manager of Electric Controller & Mfg. Co., a division of Square D Co., Detroit. Dr. Leitch will headquarter in the Detroit executive offices. He will coordinate engineering activity for Square D plants. He was vice-president and chief engineer of Electric Controller prior to its recent merger with Square D as an operating division. Mr. Dyer will have offices in the new Cleveland plant of Electric Controller. Before the merger he was vice-president of sales for the Ohio company.

Joseph V. DiMasi has been appointed advertising manager of Fansteel Metallurgical Corp., North Chicago, Ill. He succeeds *Allan L. Percy* who continues as director of public relations. *Ralph W. Rawson* has been named chief engineer in charge of the new engineering department.

D. Frank Mederos has been elected vice-president and assistant to the president of Walworth Co., New York City. He will be located in Boston. The firm manufactures valves and pipe fittings.

Merle W. Kremer has been appointed assistant general manager of the parts division of Sylvania Electric Products Inc., New York City. He will continue his present duties as general manufacturing manager, with headquarters in Warren, Pa.

THE ALL NEW Weldit SINGLE STAGE Regulator

The Weldit Series 55 Single Stage Regulator is designed to meet the requirements of modern industry. It is precision built for longer life and is easily repaired without special tools.

- Top Performance
- Low Cost
- Rugged
- Dependable
- Safe
- Adaptable to both light and heavy duty work

Weldit INC.
SINCE 1918

990 OAKMAN BLVD.
DETROIT 38, MICHIGAN

FIRST TRULY PORTABLE
200 AMP. ARC WELDER
Weighs only 65 lbs.; carry it to the job!
WELDS 2 PIECES OF 1½ in. STEEL!

THE BREN-WELD
MODEL 200 AW
Featuring the new
TRANSOIDAL
(A development of the toroidal coil)
TRANSFORMER
(Fully protected by patent applications)

Obsoletes All Other Welders of Comparable Rating!

The portable BREN/WELD does the work of conventional welders 4 to 5 times its size and weight. Eliminates the necessity to transport bulky equipment or heavy parts to be welded.

BREN/WELD handles electrodes from 3/32" through 5/32"; it has adjustable arc voltage for various arc characteristics.

BREN/WELD is ideal for plant production and maintenance, construction work, railroads, on the farm and in home workshops.

24 HOURS DELIVERY FROM STOCK!

Comes complete with 2-10 ft. cables, ground clamp and electrode holder.
- 200 Amp.—At 50% Duty Cycle
- 110/220 Volts A.C., 50/60 Cycles
- Also Available For 220/440 Volts
- Simple To Use—Fully Guaranteed
- Has An 80% Power Factor.

11" x 12" x 7½"
List Price $169.50
F.O.B., L. I. City, N. Y.
Lowest Price on Market for Comparable Ampere Rating

FREE! For details of free trial offer and folder see your dealer or write directly.

A KASSON PRODUCT

Manufactured by
BRENNEN, BUCCI & WEBER, INC.
Integrity Since 1919
262 MOTT ST., NEW YORK 12, N. Y.

Where a few POUNDS mean more than a few YEARS

Safety and *long life* are prime considerations in the design of Harrisburg High Pressure Gas Cylinders. Yet they are as light as sound engineering permits, without a pound of excess weight. True, we might shave off a few more pounds, but it would entail shaving off more than a few years from their life expectancy.

Industry expects a quarter-century or more of safe service from compressed gas cylinders, based on long experience with the Harrisburg product. Industry can continue to do so, for Harrisburg Cylinders will always be built for a long and safe future. Send for prices and literature.

More than a century in Harrisburg

Harrisburg Steel
CORPORATION
HARRISBURG 8, PENNSYLVANIA

AT THE FRONTIERS OF PROGRESS YOU'LL FIND

AN AIR REDUCTION PRODUCT

FOR WELDING AND CUTTING...

IN THE RED DRUM

HIGHEST QUALITY

DUST-FREE

NATIONAL CARBIDE

Write for the name and address of the NATIONAL CARBIDE supplier nearest you.

National Carbide Company
GENERAL OFFICES: 60 EAST 42ND STREET, NEW YORK 17, N. Y.
A DIVISION OF AIR REDUCTION COMPANY, INCORPORATED

Earlbeck & Landrum, Inc., Baltimore, Md., distributor, has made the following personnel changes. *Charley Basel*, formerly head sales technician, is now assisting *Al Earlbeck* and *Bill Landrum* with purchasing-management problems. *Joe Bauer*, after four years in the service department, has been promoted to sales technician. *Howard Bauer*, who succeeds him, brings over 20 years experience as weldor, mechanic and electrician. *Ford Watson* remains manager of the service department.

John S. Dewar has been appointed president, National Carbon Co., division of Union Carbide Canada, Ltd.

The following appointments have been made by Norton Co., Worcester, Mass.: *Edwin C. Evans* of Troy, N. Y. was elected a director. He is vice-president and assistant general manager of Norton's Behr-Manning division, Troy, N. Y. *Howard J. Daly* has been named vice-president in charge of crude abrasive plants. He has been manager of bauxite and crude abrasive plants since 1949 and a director since 1953.

L. J. Morris has been appointed assistant district manager at Pittsburgh of Tube Turns, a division of National Cylinder Gas Co., Louisville, Ky. He succeeds *W. C. Robinson*, who was recently made an assistant sales manager in the company's eastern division.

Elston J. Tribble and *Aloysius M. Tullo* have been named vice-presidents by Worthington Corp., New York City. Mr. Tribble, formerly assistant vice-president, manufacturing, will supervise a group of operating divisions recently organized under a decentralization program. Mr. Tullo will continue as general manager of the Harrison, N. J., division.

C. G. Reavis has been appointed manager of the new Texas division plant of Norris-Thermador Corp, Waco. Formerly works manager of Sterling Wheelbarrow Co., Milwaukee, Mr. Reavis will be in charge of operations at the new 34,000 sq ft metal-fabricating plant.

Joseph G. Cannon has been named field sales manager for the Tungsten and Chemical Division of Sylvania Electric Products, Inc., New York City. He will headquarter at division offices in Towanda, Pa.

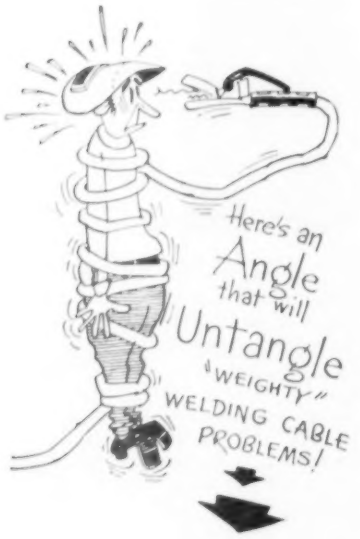
No. 2 The RIGHT FLUX for the JOB No. 6
No. 4 No. 7

BACKED BY 60 YEARS OF TESTED PERFORMANCE

Whatever the particular job you have to do—we have the right FLUXINE you need. Besides our 25 FLUXINES we carry a complete line of "KOP-R-ARC" coated rods for welding copper and all copper alloys.

Write on company letterhead for chart and generous sample stating which FLUXINE desired.

KREMBS & COMPANY
(Est. 1875)
Dept. J, 669 W. Ohio St., Chicago 10, Ill.



*TWECO-LITE

*the new flexible ALUMINUM welding cable that weighs half as much, lasts longer, costs less

Send for free catalog

A Product of
TWECO PRODUCTS COMPANY
Wichita 1, Kansas

Smith Welding Equipment Corp., Minneapolis, has announced the following personnel changes: *W. Howard Fulton* has been appointed products planning engineer. He will be in charge of development and testing of all new products. He was formerly district manager in the southern territory. *H. L. McElhoe* succeeds him as district manager in the southern district.

J. William Wade has been appointed assistant to the manager of the advertising branch of The Carborundum Co., Niagara Falls, N. Y.

Arthur L. Phillips has been appointed editor of the *Welding Handbook* by the American Welding Society, New York City. He has been associated with the metals field for a number of years, specializing in welding technology in the past four years. He has written a number of welding manuals as well as many articles on welding and related subjects. He was formerly Welding Alloys Corp., Flushing, director of public relations, Eutectic N. Y.

Harry L. Schultz has joined the Warco Press sales engineering department of The Federal Machine & Welder Co., Warren, Ohio.

Everett M. Hicks, vice-president and manager of the grinding machine division of Norton Co., Worcester, Mass., has been named a member of the Machine Tool Manufacturers Industry Advisory Council by the Business and Defense Services Administration of the U. S. Department of Commerce.

Charles W. Boesel has joined the staff of Welder Service Co., Toledo. *James Follas*, formerly office manager, has been appointed to a position in field sales and engineering.

Tom Caffo has been appointed sales representative for southern California by Superweld Corp., North Hollywood, Calif. He was formerly production control foreman.

Raymond H. Sullivan, senior engineer of National Cylinder Gas Co., Chicago, retired recently after 23 years of service. An authority on manufacture and use of acetylene, he served for many years on committees of the Compressed Gas Association and International Acetylene Association.

For WELDING Savings—Install Dry® Rod Electrode Ovens

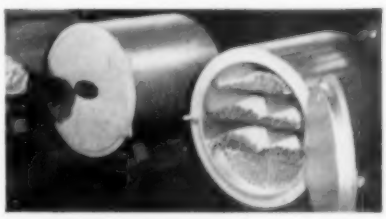
Avoid Scrap Losses, Reworks — Rejects

Your DRY-ROD Oven insures against defective welds caused by moisture. Protects low-hydrogen, austenitic, special alloy electrodes, as well as iron powder contact rods. Aids steadier welding, with less slowdown, reworks, and scrap. Repays its cost out of rod salvage alone. Costs less than 15c in 24 hours.

DRY-ROD is completely wired, ready to use. Available in 2 sizes for all industrial requirements. See your welding supply dealer.

Dry-Rod

DIVISION OF
PHOENIX PRODUCTS CO.
4715 N. 27th St. Milwaukee 16, Wis.
X-dr-22



Now, for the first time, a portable kit, 110 volts A.C., that will insulate cable connectors with neoprene sleeves, permanently vulcanized to the cable jackets . . .

. . . in your own plant . . . in the field . . . in minutes . . . no training needed!

Tapered sleeve connection produces a waterproof joint when connector is locked. Low cost . . . completely safe . . . quick disconnect. Outlasts ordinary connections 3 to 4 times.

Write for FREE literature today!

cam-lok DIVISION,
EMPIRE PRODUCTS INC., P.O. Box N-98, Cincinnati 36, Ohio

Bela M. Ronay, superintendent of the welding laboratory, U. S. Naval Engineering Experiment Station, Annapolis, Md., has announced his retirement effective June 15. Mr. Ronay has been superintendent of the welding laboratory since its establishment in 1931. He intends to enter the consulting field. He is a member of the American Welding Society.

Died . . .

Walter E. Palmer, district sales representative for The Champion Rivet Co., Cleveland, died recently of burns suffered when his car burst into flames following a head-on collision. The accident occurred on Pulaski Skyway in Jersey City, N. J. Mr. Palmer lived in Cresskill, N. J. A steady contributor to WELDING ENGINEER, Mr Palmer confined his articles largely to work done in job shops throughout his sales territory. His most recent article, "Coal bucket welds," appeared in the November, 1955 issue. Another article was being edited at the time of Mr. Palmer's death and will appear shortly.

Hugh F. Brown, Sr., president of National Welding Equipment Co. and Brown Bros. Welding Co., both of San Francisco, died early last month at the age of 71.

He was a member of the American Welding Society and a founder of the San Francisco section. Active in the Welding industry over 46 years, he contributed materially to its development. Mr. Brown had his first experience with welding in an experimental welding shop at Denver in 1910. In 1911 he helped organize the Metal Weld Co., San Francisco. It was here he and his early associates built one of the first electrolytic plants. In 1912 he and his brother Will formed Brown Bros. Welding Co. Mr. Brown pioneered in development of gas welding and flame-cutting equipment. Among his pioneer designs was a pipe-cutting and bevelling machine.

William J. Bentley, president of Bentley Sales Co., Milwaukee, died early last month. He was a charter member of the National Welding Supply Association and one of its strongest supporters. He served as vice-president (1946-47) and as a member of the board of directors (1945-50).

Corrosion survey

1950-1951 BIBLIOGRAPHIC SURVEY OF CORROSION. Published by National Association of Corrosion Engineers, Houston, 1955. Hard cloth binding, 8½ x 11 in., 430 pages. Price $12.50 for non-members of NACE; $10 to members of NACE. Available from National Association of Corrosion Engineers, 1061 M & M Bldg., Houston 2, Texas.

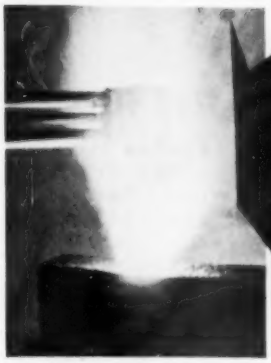
Summaries of 4,454 corrosion and corrosion prevention articles, books and brochures, published 1950-1951, are compiled in this volume. The NACE Abstract Filing Index is used to classify the material topically. There are eight main groups: general, testing, characteristic corrosion phenomena, corrosive environments, preventive measures, materials of construction, equipment and industries. Each main group is subdivided and topical cross-references are appended to each section.

The subject index lists metals and alloys by trade name and indexes them according to specific properties and behavior in specific media. The author index contains more than 4,000 names; companies and associations are not listed. Referencing is done by classification and serial numbers of abstracts. An appendix is included for aid in locating copies of foreign and domestic journals. This is the fourth in a series of bibliographies on corrosion literature.

Industrial furnace

INDUSTRIAL FURNACES. Vol. II, 3rd edition. By W. Trinks. Published by John Wiley & Sons, Inc., New York City, 1955. Cloth, 6 by 9 in., 358 pages. Price $10.00

While the subject matter of this edition is arranged like that of its predecessor of 14 years ago, the book has been almost completely rewritten. Although there are only seven chapters, they are comprehensive in their coverage, discussing such subjects as: fuels and electric energy; combustion devices and heating elements; control of temperatures and atmospheres; labor-saving devices; critical comparison of fuels and of furnace types and safety measures. The chapter on safety measures is new to this edition.



M38 Torch beginning cut in wooden "two-by-four". Note how intense heat envelopes head of torch.

Note unchanged condition of torch head after "two-by-four" has been penetrated.

This test proves that
K-G TORCHES
have "what it takes"!

Cutting through a wooden "two-by-four" is a tough test for any torch. Yet, as shown in the two photographs, our M38 Torch came through with flying colors.

Wood, unlike metal, conducts heat very slowly away from the cut. The concentrated heat reflects backward over the head of the torch. The Monel head of the M38 Torch resists distortion from this intense heat and the gas passageways remain operative.

It will be found even after such an extreme test as this that the M38 head will still take a new cutting tip. NO DISTORTION HAS OCCURRED.

If you want the best in cutting and welding torches call your K-G Distributor, or send for 24-page catalog.

The K-G Equipment Co. (Inc.)
Dept. A, 1744 Lehigh St., Allentown, Pa.

SS HI-C
TRACTOR GROUSER BARS
HIGH CARBON STEEL ALLOY

40 Anniversary STULZ-SICKLES CO. MANSFIELD

CUT COSTS
-- on rebuilding
worn
tractor
grousers

- Take less time to attach with any good grade of low hydrogen electrode.
- Cost less to buy, yet stand up under severe wear.
- Easy to attach by any electric welding method.

Write for BULLETIN
SS Hi-C and Price List

STULZ-SICKLES CO.
SOLE PRODUCERS 92 N. J. RAILROAD AVE. NEWARK, N. J.

NEAREST DISTRIBUTOR UPON REQUEST

FOR BEST RESULTS USE

Silvaloy

Silver Brazing Alloy preforms for Production Brazing. Rings, Stamped or Coined Washers and Wire Forms

All inquiries given immediate attention and shipments made on short notice. Technical service men are available to assist you in proper joint design. Silvaloy brazing alloys also available in wire, strip, and powder from stocks in six branch warehouses.

1200 FLUX

Use when silver brazing Brass, Bronze, Copper, Nickel-Silver, Steel, Stainless Steel, Monel, Nickel, Inconel and other Nickel alloys. Furnished in ½ lb., 1 lb., 5 lb., 30 lb., and 65 lb. containers.

STEEL SALES

3348 S. PULASKI ROAD • CHICAGO 23, ILLINOIS

PLANTS: DETROIT, ST. LOUIS, MILWAUKEE, MINNEAPOLIS, INDIANAPOLIS

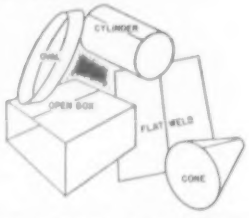
OFFICES: KANSAS CITY, GRAND RAPIDS

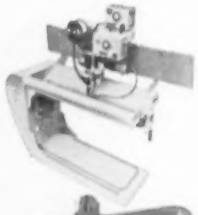
AIRLINE'S "KNOW-HOW" AT YOUR DISPOSAL

THESE TWO FIXTURES CAN GIVE YOU ACCURATE – SMOOTH – PRESSURE TIGHT Fusion Butt Welds

If you make these

You need these





AIRLINE MODEL LW SERIES 1000

Longitudinal Welding Fixture

Manufactured in 2 ft. to 12 ft. lengths. "Toe touch" control permits controlling fingers from any position. Welds sheets, cones, cylinders, boxes, etc., from .010 to one inch thickness. Suitable for MIG, TIG, submerged-arc and hand welds. Available also as complete package.

AIRLINE MODEL R 4000

Planishing Roll—60 Inch Throat

High Roller Face Pressure. Cold works welds and adjacent areas, flattens and smooths fushion welds, increases mechanical properties, reduces grinding. Also flattens flash welds, mash welds, resistance welds and elongated weld areas. Diameters 1¼ in. to 10 ft., and to 10 ft. lengths on large diameters.

WRITE TODAY FOR COMPLETE DATA AND SAMPLES

AIRLINE WELDING and ENGINEERING

785 N. PRAIRIE, HAWTHORNE, CALIF., ORegon 8-5112 - OSborne 5-2225

Beryllium copper

THE 'TRU-CAST' HANDBOOK. Published by Manco Products, Inc., Melvindale, Mich., 1955. Paper, 5¼ x 8¼ in., 48 pages. Price $2; free to firms engaged in stamping, molding and related fields, if requested on company letterhead.

This booklet is intended as a guide to the uses of beryllium-copper pressure-cast cavities and cores in various applications, including injection molding, compression molding, zinc die casting and die stamping.

Charts, diagrams and photographs are used throughout to aid in explanation. The discussion includes finishing techniques such as machining, polishing, plating, soldering and welding, and methods of heat treatment.

A checklist, referring back to various sections, summarizes highlights of the booklet. A glossary lists technical terms referred to in manufacture and use of beryllium-copper mold components.

Titanium

TITANIUM IN IRON AND STEEL. By George F. Comstock. Published for the Engineering Foundation by John Wiley & Sons, Inc., New York City, 1955. Paper, 6 by 9¼ in., 291 pages. Price $6.

The third publication in the "Alloys of Iron Research, New Monograph Series," this book reviews and correlates the important published data on titanium as an alloying element in iron and steel.

Beginning with a general discussion of titanium and its minerals, including details on principal sources, concentration, preparation, and related fundamentals, the book proceeds to the working aspects of titanium.

In turn, the discussion is devoted to titanium as a deoxidizer in rimmed and killed wrought steels, effects of titanium on nitrogen and sulphur in steel, titanium in cast steel and cast iron, general effects of titanium as sole alloying element in pearlitic steels, and titanium in low-alloy steel.

Concluding chapters cover carbide stabilization by titanium in unalloyed steels or steels of less than 4% alloy content and in steels containing over 4% chromium, and titanium in precipitation-hardening steels and in complex heat-resisting alloys.

Both Fahrenheit and Centigrade temperatures are given. Recommendations of such organizations as American Society for Testing Materials, American Society of Mechanical Engineers, and American Standards Association are incorporated. A 15-page bibliography is included.

30 YEARS AGO

(Taken from *The Welding Engineer* of March, 1926)

The Lincoln Electric Co., Cleveland, has brought out an automatic electric arc welder for seams and girths of underground storage tanks.

—30 YEARS AGO—

O. L. Howland has joined the staff of Central Steel & Wire Co., Chicago. Mr. Howland was formerly with the Indianapolis office of The Lincoln Electric Co.

—30 YEARS AGO—

St. Paul Welding & Mfg. Co., St. Paul, has developed a new model of its "Torit" torch suitable for all kinds of small jobs requiring heat, as soldering, radiator work, tempering, etc.

—30 YEARS AGO—

The two Fokker monoplanes used by the Detroit Arctic Expedition to the South Pole are of welded construction. Capt. G. H. Wilkins was in command.

—30 YEARS AGO—

Elkon Works, Inc., Weehawken, N. J., has put on the market a new series of copper, and other metal tungsten alloys, termed "Elkonite."

—30 YEARS AGO—

Henry F. Pratt has been named sales manager of American Oxygen Service Co., New York City.

—30 YEARS AGO—

A. V. B. Cutler, with headquarters in Chicago, has been appointed Midwest representative for Acme Electric Welder Co., Philadelphia.

—30 YEARS AGO—

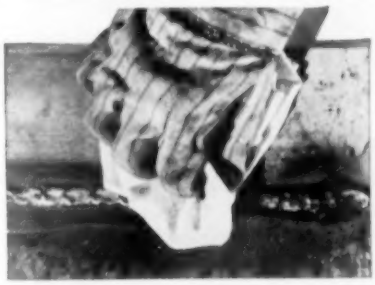
J. J. Gaffney, formerly with Steel Sales Corp., Chicago, has accepted a position with Una Welding & Bonding Co., Cleveland. He will be located in the New York City office.

—30 YEARS AGO—

Union Carbide Sales Co., New York City, has made the following changes. John D. Swain has been transferred to the New York office as general manager; William C. Harrison has been appointed western manager with offices in Chicago; E. B. Suydam has been appointed eastern manager to be located in New York City.

—30 YEARS AGO—

Elmer Smith, of Smith's Inventions, Inc., Minneapolis, recently toured South America.



cut weld cleaning time by 85%

Throw away your cold chisel and whisk off weld spatter with a dry rag! Protect-O-Metal spatter-proofing compounds make weld cleaning a breeze. Improve your welds at the same time — P-O-M compounds quiet the arc, improve fusion and electrode operation, prevent oxidation and annealing scale, cause no porosity. No smoke, odors, or fumes.

P-O-M No. 2. Non-inflammable, non-toxic, water-soluble paste. Inorganic. Thin before applying and start welding at once. $3.30 per gallon, f.o.b. Dayton.

P-O-M No. 8. Rust- and corrosion-resistant resin base compound. Comes ready to use. Safe for all metals. Good paint primer; permits outdoor storage of sub-assemblies. $3.35 per gallon, f.o.b. Dayton.

MONEY-BACK TRIAL OFFER

Order a trial gallon of each today for testing in your shop. We'll cancel the bill if you're not satisfied.

PROTECT-O-METAL

G. W. SMITH & SONS, INC. 5408 KEMP ROAD, DAYTON, O.

DIAL SET LEVEL

MARK A CENTER LINE at any angle

DIAL SET 45°

TO ESTABLISH AND MARK a point at any degree of angle on shaft, pipe or tube without numerous calculations or "cut and try" methods use the Boyce Centering Head. It's a must for welders, machinists, pipe fitters and boilermakers because it is *absolutely accurate* and saves time. Small enough to fit in your pocket, it weighs only 9 ounces. Order yours today or write for information.

MEASURE DECLIVITY

CHECK ANGLE BENDS

ESTABLISH BUTT-IN ANGLES

CONTOUR MARKER CORP.

1843 E. Compton Boulevard, Compton, California

Boyce CENTERING HEAD

When You Weld Cast Iron
Select the Correct

Fuse-Well

CAST IRON WELDING RODS OR ELECTRODES

FUSE-WELL NO. 11

FUSE-WELL No. 11, *Square*—Gray Cast Iron Welding Rod for Acetylene use in filling or building up new or worn castings producing machineable welds.

FUSE-WELL NO. 12

FUSE-WELL No. 12, *Round*—Has the same uses and analytical ingredients as Fuse-Well No. 11.

FUSE-WELL NO. 14 MOLY

FUSE-WELL No. 14, *Moly*—An Iron Base Rod with alloys added for finer grain structure and greater strength.

FUSE-WELL NO. 22

FUSE-WELL No. 22, *Electrode* — Light coated Rod to be used for AC or DC welding in the fabricating and repairing of cast iron castings.

Sold through Leading Distributors

THE CHICAGO HARDWARE FOUNDRY CO.
Weld Rod Division
NORTH CHICAGO, ILLINOIS

***TWECO-LITE**

*the new flexible ALUMINUM welding cable that weighs half as much, lasts longer, costs less

Send for free catalog

A Product of
TWECO PRODUCTS COMPANY
Wichita 1, Kansas

ADVERTISERS IN THIS ISSUE

Airline Welding & Engineering	112
Air Reduction Sales Co.	51, 85, 94
Allen, L. B.	114
Allied Steel & Tractor Prods., Inc.	114
Alloy Rods Company	77
All-State Welding Alloys Co., Inc.	106
American Chain & Cable Co. Page Steel & Wire Div.	72-73
American Manganese Steel Div.	97
American Optical Company	41
American Platinum Works, Inc.	13
Ampco Metal, Inc.	66
Anti-Borax Compound Co.	96
Atlas Welding Accessories Co.	12
Belden Mfg. Company	Inside Front Cover
Bernard Welding Equipment Co.	70
Brennen, Bucci & Weber, Inc.	107
Buck Manufacturing Co.	88
Burdett Oxygen Co.	57
Cam-Lok, Div. of Empire Products, Inc.	110
Carborundum Company, The	49
Carol Cable Div., Crescent Co., Inc., The	11
Cayuga Machine & Fabricating Co.	86
Chicago Eye Shield Company	2
Chicago Hardware Foundry Co.	114
Contour Marker Corp.	102, 113
Coyne Cylinder Co.	110
Cullen-Friestedt Co.	105
Detroit Testing Machine Co.	104
Dockson Corporation	64
Drawalloy Corporation	91
Engwald Corporation	88
Erico Products, Inc.	55
Eutectic Welding Alloys Co.	38-39
Federal Machine & Welder Co.	93
General Electric Company	42, 43, 44
Glenn Company	105
Goldsmith Bros. Smelting & Refining Co.	80
Handy & Harman	69
Harnischfeger Corp.	74, 98
Harrisburg Steel Corp.	108
Harris Calorific Co., The	95
Haynes Stellite Co., Div. of Union Carbide & Carbon Corp.	47
Heath Engineering Co.	100
Helmco, Inc.	99
Hobart Bros. Company	1
Independent Engineering Co., Inc.	104
International Nickel Co., Inc.	81
Jackson Products	4
K-G Equipment Co., Inc.	111
Kedman Company	94
Krembs & Co.	109
Lewis Welding & Engineering Corp., The	60
Lincoln Electric Co.	14
Linde Air Products Co., A Div. of Union Carbide & Carbon Corp.	89
Mallory & Co., Inc., P. R.	54
Merit Products, Inc.	59
Metal Bond Mfg. Company	105
Metal & Thermit Corp.	71, 87
Miller Electric Mfg. Co.	Front Cover, 101
National Carbide Co.	108
National Cylinder Gas Co.	62-63
National Welding Equip. Co.	7
Norris-Thermador Corp.	83
Page Steel & Wire Division American Chain & Cable Co.	72-73
Pandjiris Weldment Co.	10
Phoenix Products Co.	109
Progressive Welder Sales Co.	58
Ruemelin Mfg. Co.	90
Sellstrom Mfg. Co.	105
Smith Corp., A. O.	78-79, Back Cover
Smith, G. W. & Sons, Inc.	113
Square D Company	9
Steel Sales Co.	112
Stulz-Sickles Company	111
Sylvania Electric Products	Inside Back Cover
Taylor-Winfield Corp.	76
Tempil Corporation	92
Thomson Electric Welder Co.	36-37
Tillman Co., John	99
Tube Turns, Inc.	67, 68
Tweco Products	92, 94, 99, 100, 109, 114
Union Carbide & Carbon Corp. Haynes Stellite Company	47
Union Carbide & Carbon Corp. Linde Air Products Company	89
Unique Turn Table Co.	102
United States Steel Corp.	35
United Wire & Supply Corp.	84
Vickers Electric Div., Vickers, Inc.	53
Victor Equipment Co.	16
Vogel Tool & Die Corp.	96
Wagner Mfg. Co.	50
Weldit, Inc.	107
Westinghouse Electric Corp.	82
Worthington Corp.	8
York Engineering Co.	90

WHERE TO BUY

6714 Bryn Mawr Ave.

for a firm grip . . .
demand
Allied **BULLDOG**

- EXCLUSIVE DESIGN
- INCREASED TRACTION
- RE-LUG WITHOUT DISMANTLING
- WORK-HARDENING STEEL
- SCIENTIFICALLY "WELD-METALIZED"
- ANY SIZE OR SHAPE

Also . . .
Steel Plate, Grader Blades, Special Cutting Edges

Territory open for agents and dealers
ALLIED STEEL & TRACTOR PRODUCTS, INC.
7835 Broadway • Cleveland 5, Ohio, U.S.A.

CLASSIFIED

THE WELDING SHOPPER

ADVERTISING

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE

(Not available for equipment advertising)

90c a line, minimum 3 lines. To figure advance payment, count 5 average words as a line.

INDIVIDUAL EMPLOYMENT WANTED advertising rate is ½ the above rates, payable in advance.

PROPOSALS, 90c a line an insertion.

INFORMATION

BOX NUMBERS count 1 line additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED RATE

The advertising rate is $8.75 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. W.E.

SCHOOL

WELDING—A profitable trade. Demand for trained men. Learn quickly at best equipped school in U. S. Non-profit. G. I. approved. Catalog free. Write: Hobart Welding School, Box U-361, Troy, Ohio.

POSITION WANTED

COLLEGE INSTRUCTOR desires position in training, supervision or consulting work in the welding field. Over 35 years of experience as journeyman, foreman and instructor, and could qualify in any of above fields. Desires the South or West Coast areas. Write Box No. 366, Welding Engineer, 12 E. Grand Ave., Chicago 11, Ill.

HELP WANTED

SALES REPRESENTATIVES—calling on industrial accounts and/or welding supply distributors. To handle a complete line of specialty electrodes. Excellent potential. Write Box No. 364, Welding Engineer, 11 E. Grand Ave., Chicago 11, Ill.

TWO—DISTRICT MANAGERS to cover sizeable territories promoting arc welder sales through authorized Distributor organization. Applicant should be familiar with arc welding processes and equipment. A 3-month training program will qualify experienced, aggressive man to better than average earnings based on salary and bonus plus traveling expenses. In replying state age, background, experience and expected earnings. If possible, send photograph and references whom we may contact. Reply to Box No. 363, Welding Engineer, 12 E. Grand Ave., Chicago 11, Ill.

WELDING ENGINEER-CHIEF

A national multi-plant organization requires an experienced Welding Engineer and Metallurgist to have complete responsibility for welding design and practice. Fabrication of code vessels of carbon and stainless steels, aluminum and copper base materials. College plus 8 or more years experience. High salary plus profit sharing.

Write B. H. Van Dyke, Air Products, Inc., P. O. Box 538, Allentown, Pa. or telephone collect Woodring 5-9001.

BOOKS

WELDING BOOK BARGAINS
½ PRICE SALE

WELDING DESIGN HANDBOOK, formerly $2.00 now $1. Paper cover, 8½ x 11 in., 84 pages.

WELDING—ITS QUESTIONS AND ANSWERS, was $1.50 now 75c. Cloth cover, 5 x 8½ in., 178 pages.

No charges or C.O.D.—cash with order postpaid.

WELDING ENGINEER
12 E. Grand Ave., Chicago 11, Ill.

BUSINESS OPPORTUNITIES

A NICE REPEAT BUSINESS
JOBBERS WANTED IN EVERY CITY TO SELL "WELDER'S PAL" EYE DROPS
On the market for 20 years
CARHOFF COMPANY
11706 Kinsman Rd., Cleveland 20, Ohio

EQUIPMENT FOR SALE

FOR SALE — BARGAIN PRICES
Several thousand pounds of 5/32" Arcos Stainlend KMO-type 316 Stainless electrodes.
CLOVIS GEE SUPPLY COMPANY
1005 West Reno
Oklahoma City, Oklahoma

FOR SALE

1—Used 50 meter Superior Oxygen Plant, complete with air and oxygen compressors. Less gas holder and scrubbing towers. Produces over 1 million feet monthly.

1—New 02B Independent Oxygen Plant, complete, mounted on trailer. 400,000 Cu.Ft. per month capacity.

3—New Nordberg Air Compressors, 5000 C.F.H. capacity.

2—New Nordberg Oxygen Compressors, 1500 C.F.H.

1—Used Ingersoll Rand Air Compressor with 50 H.P. motor. 5000 C.F.H. capacity.

DYE OXYGEN COMPANY, INC. MFRS.
3332 West McDowell Road
Phoenix, Arizona

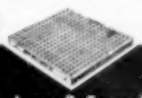
FOR SALE OR LEASE
PURE OXYGEN GAS PLANTS
Complete and Erected
(1) 1,500,000 cubic feet per month
(1) 2,500,000 cubic feet per month
(1) 5,000,000 cubic feet per month
SOLD AND GUARANTEED OPERATION LIKE NEW
Shipment/Delivery on and after May 1st
For complete information, prices and terms, write
BOX 365, WELDING ENGINEER
12 East Grand Avenue
Chicago 11, Illinois

REPLIES (Box No.) Address to office at 12 E. Grand Ave., Chicago 11, Ill.

CUTTING MACHINES, AIRCO Como & Radiagraphs.
SEAM WELDER, Progressive, 150 KVA, New.
SPOT WELDER, National, 40 KVA, Used.
CUTTING TORCHES, Used, Oxweld, Airco, Harris.
WELDING TORCHES, New, Rego GV.
BRONZE—STAINLESS—AMPCOTRODES.
NO. 12 LENSES, ELECTRODE HOLDERS.
RALL SUPPLY CO. 51 E. 42nd St., N.Y.C. 17

Mech. Tubing **STEEL** Piping
All Sizes—Hvy Walls—Large O.D.
• CARBON • ALL ALLOYS • STAINLESS
Inquiries Answered Promptly
MIDCONTINENT TUBE SERVICE, INC.
2308 Oakton St., Evanston, Ill. Davis 8-4030

Welding Platens

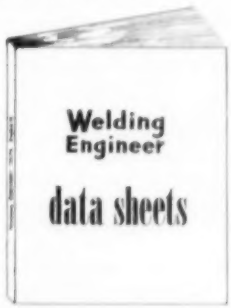


Acorn Iron & Supply Co.
901 N. Delaware Ave. Phila. 23, Penna.

IN 100-LB. LOTS, F.O.B. SCRANTON
SALE OF SURPLUS ELECTRODES
AMPCO-TRODE, 3/16" x 14" No. 18 Aluminum Bronze Coated D.C. Electrodes in Good Condition—25 lb. Cartons—80c lb.
SCRANTON WELDING SUPPLY COMPANY
1301 Wyoming Ave. Scranton, Penna.

Fingertip Control

. . . of welding information to help you is here in . . .



This cross-indexed volume contains 116 of the best Data Sheets appearing in WELDING ENGINEER in the past 15 years. Yet it costs only $1.40!

See your welding supply distributor or order from:

Welding Engineer
12 E. Grand Ave.
Chicago 11, Ill.

free literature . . . . . USE CARD ON OPPOSITE PAGE

51. WELDER-GENERATOR—The Lincoln Electric Co. 4-page folder (SB-1339-2) describes "Weldanpower" combination 200-amp welding and standby power unit.

52. WELDING ACCESSORIES—Jackson Products, Inc. Catalog No. 55 contains latest models of arc welding accessories, including electrode holders, safety equipment, ground clamps.

53. EXHAUST HOSE—Flexaust Co. Bulletin 50 discusses types of hose for use in welding dust and fume control.

54. ELECTRODE—Alloy Rods Co. Data sheet describes composition and uses of "Atom Arc 9016CM", an all-position, iron-powder, low-hydrogen electrode for piping and boiler work.

55. DUST COLLECTOR—Green Fuel Economizer Co., Inc. Bulletin 172-CFF treats "Aerodyne" dust collector

56. POWER TUBES—General Electric Corp "Interchangeability List" (ETI-719B) gives, in 7 pages, a listing of 282 tube types in alphabetical and numerical order.

57. STEEL RULE—Carlson Rules and Measures. Sheet illustrates and describes 16-ft-long steel tape rule and also a variety of other tape rules.

58. WELDOR'S ACCESSORIES—Metro Mfg. Co. Parts catalog describes and illustrates cylinder connections, hose fittings, welding hose.

59. BRAZING—Selas Corp. of America. Bulletin S-1050 explains production brazing and soldering using automatic equipment.

60. AIR, WATER VALVES—Barksdale Valves. Catalog 5-C gives solenoid operated valves cataloged by major service condition, including characteristics, flow patterns, dimensions.

61. PLASTIC BONDING—Rubber & Asbestos Corp. Chart lists technical data and uses for 30 adhesives for bonding plastics and metals to themselves and each other.

62. HEAT MEASUREMENT—Tempil Corp. 7-page booklet "How temperatures are measured" discusses heat, temperature and modes of measuring.

63. WORK CENTER—Technion Design & Mfg. Co. Bulletin 101 describes "Roto-Jig," a universal brazing or soldering work center.

64. AUTOMATIC WELDER—Mir-O-Col Alloy Co., Inc. Illustrated sheet gives specifications and uses of "Model K-2-M" automatic welding machine.

65. RADIOGRAPHY—Holger Andreasen, Inc. Folder illustrates and discusses "Andrex" portable X-ray units (200 kvp and 260 kvp) for industrial radiography.

66. PORTABLE WELDER—Graham Mfg. Corp. Bulletin No. 6000-955 treats portable welder designed for welding most ferrous and non-ferrous metals.

67. RESISTANCE WELDING—Uniflex Cable Div. Booklet (Form No. UM-116) explains how to select resistance welding cable of adequate capacity.

68. SPOT WELDER—Thomson Electric Welder Co. Bulletin 322 clearly explains features and uses of "Model A-2" spot and/or projection welder.

69. ELECTRODE CHART—Welding Engineer Publications, Inc. Chart compares stainless-steel electrodes of 22 manufacturers, giving AWS numbers.

70. INDUCTION HEATING TUBES—Amperex Electronic Corp. Data is available on two triodes, Types 6756 and 6757, which are oscillator tubes for induction heating.

71. SAFETY EQUIPMENT—Dockson Corp. Catalog S-55 contains complete line of head and eye-protection equipment for weldors.

72. ELECTRODE—Ampco Metal, Inc. Bulletin W-17 "Welding with Ampco Bronze Electrodes-Filler Rod-Wire" describes welding with such materials.

73. BRAZING—Handy & Harman. *Low-Temperature Brazing News* (No. 71) gives case histories of brazing with "Sil-Fos" silver brazing alloy.

74. TOGGLE CLAMP—Erico Products, Inc. Illustrated sheet treats "Caddy" type VQ toggle clamps.

75. ARC WELDING STEEL—The Babcock & Wilcox Co. Data card 155A summarizes various recommendations for joining, by arc welding various tubing steels.

76. CLEANERS—Oakite Products, Inc. Handy booklet (F 8143R-4) tells how to use solvent detergents for removing carbon grease, rust; cleaning electrical equipment, etc.

77. WELDING INDICATOR—Harman H. Sticht Co., Inc. Bulletin 736 describes "Jaquet Indicator" for measuring slow linear speeds in welding.

78. RECTIFIER—Rapid Electric Co. Booklet H-1 details regulated d-c power rectifier for maintaining output voltage.

79. TURNTABLES—Eisler Engineering Co., Inc. Catalog 88-56 covers 150 various types of indexing, rotating turntables.

80. EYE PROTECTION—Watchemoket Optical Co., Inc. Bulletin No. 200 catalogs types of welding goggles, spectacles, face shields.

81. HARDFACING—Mir-O-Col Alloy Co., Inc. Sheet discusses hardfacing welding rod "No. 2" for use where severe impact and abrasion (in combination) are paramount factors.

82. POSITIONER—Aronson Machine Co. Illustrated sheet details "Model HTS-32" head and tail stock positioner with specifications.

ad literature

83. Airline Welding & Engr.—Data and samples on fusion butt welds.

84. Air Reduction Sales Co.—Catalog 1318-IA, "Airco Electrode Guide," on selecting the right electrode for your specific job.

85. Air Reduction Sales Co.—Catalog 9-131A on rods and fluxes for joining ferrous and non-ferrous metals.

86. Air Reduction Sales Co.—Literature on electrodes, cutting apparatus, and cutting machines.

87. Alloy Rods Co.—Write for complete information on "Atom Arc 7016" electrodes.

88. All-State Welding Alloys Co., Inc.—Pocket reference on joining aluminum and aluminum alloys.

89. American Manganese Steel Div.—Catalog, "Amsco Hardfacing Alloys," gives analyses, and metallurgical information on hardfacing.

90. American Optical Co.—Literature on safety products, including helmets and goggles.

91. American Platinum Works—A "Complete Guide to Selective Fluxing" for low-temperature silver brazing.

92. Ampco Metal, Inc.—Information on non-fuming, low-melting-point rod that gives welds with high strength and permits both joining and overlay with oxyacetylene process.

93. Anti-Borax Compound Co., Inc.—Circular and sample of solder and brazing compounds and fluxes.

94. Bernard Welding Equip. Co.—Bulletins SS-3, MP-6 and PCB-6 on electrode holders, mechanical hands and contour cleaners.

95. Brennen, Bucci & Weber, Inc.—Free trial offer and folder on 200-amp arc welder.

96. Buck Mfg. Co.—Descriptive literature on portable, magnetic plate clamps.

97. Burdett Oxygen Co.—Catalog on "Burdox" products for all welding and cutting methods.

98. Cam-Lok Div.—Literature on making your own waterproof, shockproof and Neoprene-insulated cable connectors.

99. Carol Cable Co.—Information on welding cable.

100. Cayuga Machine & Fabricating Co., Inc.—Complete information (please specify tank sizes) on tank automation.

101. Contour Marker Corp.—Information and instruction book on laying out pipe joints and establishing and marking a point at any angle.

102. Coyne Cylinder Co.—Specifications and prices on acetylene cylinders.

103. Cullen-Friestedt Co.—Write for new "C-F Positioner Catalog" on low-cost welding.

104. Detroit Testing Machine Co.—Information on tensile testing machines.

105. Drawalloy Corp.—Facts on "Wear-O-Matic" fabricated hardfacing wire for automatic and semi-automatic applications.

106. Engwald Corp.—Application data on welding-fume exhausters.

(Continued on page 118)

WELDING INFO-AIDS

USE THIS CARD for Literature, Catalogs, and Bulletins shown on facing page, and for those featured in this month's ads as listed on next page

Also information about

NEW PRODUCTS described on pages 75 to 92

Every month WELDING ENGINEER lists many new catalogs and bulletins available from manufacturers. All are yours for the asking. However, this service is valuable to you only if you use it.

USE POSTPAID CARD →

★ For copies of any manufacturers' bulletins described on page at left, circle the number of the items on card at right. Fill in your name, title, company and address. This has to be done only once on either post card. You need no postage.

★ For additional information on New Products described in this issue, circle the numbers of the items that interest you. The New Products section begins on page 75.

WARNING!

Illegible or incomplete addresses may keep you from receiving the information you desire. And remember, cards, postmarked after the deadline date cannot be processed.

★ **Post card not valid after three (3) months. After that time has elapsed, use your own letterhead to describe fully the information and/or literature wanted.**

Name_____ Title_____

Company_____

Address_____

City_____ State_____ 3/56

NOT GOOD AFTER JUNE 1, 1956

WELDING ENGINEER, 12 East Grand Ave., Chicago 11, Ill.

Please send me without obligation further information about the following:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160

Postage Will Be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD
First Class Permit No. 45854, Chicago, Ill.

Welding Info-Aids,
Welding Engineer
12 East Grand Avenue
Chicago 11, Ill.

ad literature

(Starts on page 116)

107. Erico Products, Inc.—Information about the "Caddy Test Installation Program."

108. Erico Products, Inc.—"Caddy Catalog" on arc-welding accessories.

109. Eutectic Welding Alloys Corp.—Booklet TIS 1340, "DirectoRod Guide," gives facts on saving money with low temperature welding alloys.

110. General Electric Co.—Descriptive bulletin GEA-6242 on rectifier welders.

111. General Electric Co.—Bulletin GEC-1305 on 295-amp a-c welders.

112. Glenn Co.—Literature, application data, prices on contsant-voltage welders.

113. Goldsmith Bros. Smelting & Refining Co.—"GB Data Book" giving complete information on low-temperature silver-brazing.

114. Handy & Harmon—Bulletin 20 on low-temperature silver-brazing alloys.

115. Harnischfeger Corp.—Information on arc welders with "Dial-lectric control."

116. Harnischfeger Corp.—Bulletin P-22 with information on the "P & H UP-1000 Positioner."

117. Harrisburg Steel Corp.—Prices and literature on gas cylinders.

118. Harris Calorific Co.—Folder 540710 on "Super-Heat" torch that uses oxygen and fuel gases (propane, city gas, etc.).

119. Heath Engineering Co.—Folder, "Automatic, Precision Metal Cutting."

120. Helmco, Inc.—Literature on flux pots for warming and maintaining brazing flux at constant temperature.

121. Hobart Bros. Co.—Details on a-c power/d-c welder combination.

122. Hobart Bros. Co.—Information on a-c and d-c arc welders.

123. International Nickel Co., Inc.—Handy guide to welding cast iron.

124. K-G Equipment Co.—24-page catalog on cutting and welding torches.

125. Krembs & Co.—Flux chart and samples available.

126. Lewis Welding & Engr. Corp.—Details on the "Universal" automatic-welding fixture.

127. Lincoln Electric Co.—Bulletin SB-1351 gives specifications and procedures on E-6013 electrodes made especially for sheet metal.

128. Linde Air Products Co.—Details on how Tig cutting can help you increase production and cut costs.

129. Mallory & Co., Inc., P. R.—Information on titanium developments.

130. Mallory & Co., Inc., P. R.—Reference book, "Resistance Welding Catalog."

131. Merit Products, Inc.—Write for various abrasive grits and sizes of grinding wheels.

132. Metal & Thermit Corp.—Detailed literature on how a "Kel-Ray" gamma ray projector can improve your operations and save you time and money.

133. Metal & Thermit Corp.—Information on "Murex Croloy" electrodes for welding high-temperature, high-pressure vessels.

134. Metal Bond Mfg. Co.—Catalog on soldering and welding products.

135. Miller Electric Mfg. Co., Inc.—Information about combination a-c/d-c welders.

136. National Carbide Co.—Write for name and address of nearest supplier.

137. National Cylinder Gas Co.—Complete catalog on regulators, torches, tips and accessories.

138. National Welding Equip. Co.—Book on regulators.

139. Norris-Thermador Corp.—Specifications on acetylene cylinders.

140. Page Steel & Wire Div.—Folder DH-402 sets forth analyses of automatic welding wire.

141. Progressive Welder Sales Co.—Full details on leasing welding equipment built to your requirements.

142. Ruemelin Mfg. Co.—Fume collector Bulletin No. 37E.

143. Sellstrom Mfg. Co.—Brouchure 32-G gives complete information and prices on fibre glass welding helmets.

144. A. O. Smith Corp.—Descriptive catalog on "SW-12" and other electrodes.

145. A. O. Smith Corp.—Details on "SW-44" iron-powder and other electrodes.

146. Stulz-Sickles Co.—Write for Bulletin SS Hi-C and price list on tractor grouser bars.

147. Sylvania Electric Prods., Inc.—Technical information on 2% thoriated-tungsten electrodes for Tig welding.

148. Tempil Corp.—Inforation on, and sample pellets of, temperature indicators.

149. Thomson Electric Welder Co.—Information on solving your resistance-welding problems and data on various types of resistance welders.

150. Tillman & Co., John—Catalog lists welding gloves and garments.

151. Tube Turns, Inc.—Bulletin TT-787 on "Wrought Iron Welding Fittings."

152. Tweco Products Co.—Catalog on aluminum welding cable.

153. United States Steel Corp.—Information on weldability of "T-1" steel.

154. United Wire & Supply Corp.—Catalogs and price sheets on brazing alloys.

155. Vickers Electric Div.—Bulletin on d-c magnetic-amplifier rectifier welder.

156. Wagner Mfg. Co., Inc.—Descriptive literature on "Hi-Amp" electrode holders.

157. Westinghouse Electric Corp.—Information and samples on new "SW-3," an E6013 electrode.

158. Worthington Corp.—Details on positioning equipment and nationwide sales and service.

Postage Will Be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

First Class Permit No. 45854, Chicago, Ill.

Welding Info-Aids,

Welding Engineer

12 East Grand Avenue

Chicago 11, Ill.

Name_____ Title_____

Company_____

Address_____

City_____ State_____ 3/56

NOT GOOD AFTER JUNE 1, 1956

WELDING ENGINEER, 12 East Grand Ave., Chicago 11, Ill.

Please send me without obligation further information about the following:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160

They're here!

NEW 2% THORIATED
Sylvania Tungsten Electrodes
...at lowest cost ever!

If tungsten inert gas welding is one of your shop's operations—here is good news for you!

Sylvania's new 2% Thoriated Tungsten Electrode is here . . . *at a lower price than you have been accustomed to paying for similar electrodes.*

For specific applications Sylvania 2% Thoriated Tungsten Electrodes give you easier arc starting, more stable arc, higher current capacity, longer life and increased resistance to weld pool contamination.

Remember . . . there is a *right* Sylvania electrode for *every* job. Your Sylvania welding distributor will gladly recommend the correct electrode. Be prepared for any job by ordering some of each type. For technical information, write to:

SYLVANIA ELECTRIC PRODUCTS INC.
1740 Broadway, New York 19, N. Y.
In Canada Sylvania Electric (Canada) Ltd.
University Tower Bldg., Montreal, P. Q.

Only SYLVANIA has the complete line of tungsten electrodes–

- **Puretung**
- **Zirtung**
- **Thoriated**
- **2% Thoriated**

SYLVANIA

Lighting • Radio • Electronics • Television • Atomic Energy

So I said to the boss...

"You want us to turn out better welds?
Then, you'd better switch to
A. O. SMITH SW-12 ELECTRODES.
They're the niftiest rods in Class E-6012
. . . run hot and true, fast and easy
all the time."
So the boss switched . . . so I'm a hero!
Raises and everything!

How about another magnum of bubble water, baby?

The gentleman pictured above has a one-track mind . . . and so will you, when you start using A. O. Smith SW-12 electrodes. Especially adaptable to jobs with poor fit-up, these "hot" E-6012 electrodes just won't burn through . . . permit close arc without sticking. Bead is smooth, convex . . . slag cools quickly, is easy to remove.

MAIL THIS COUPON TODAY! Get all the facts about SW-12 electrodes and other products and services offered by A. O. Smith.

A. O. SMITH CORP., Welding Products Div.
Milwaukee 1, Wisconsin

Please send me your new Electrode Catalog which describes in detail your SW-12 and other electrodes.

Name.....

Firm.....

Address.....

City.....Zone.....State.....

Through research ...a better way

A.O.Smith
CORPORATION
WELDING PRODUCTS DIVISION
Milwaukee 1, Wisconsin
International Division: Milwaukee 1, Wisconsin